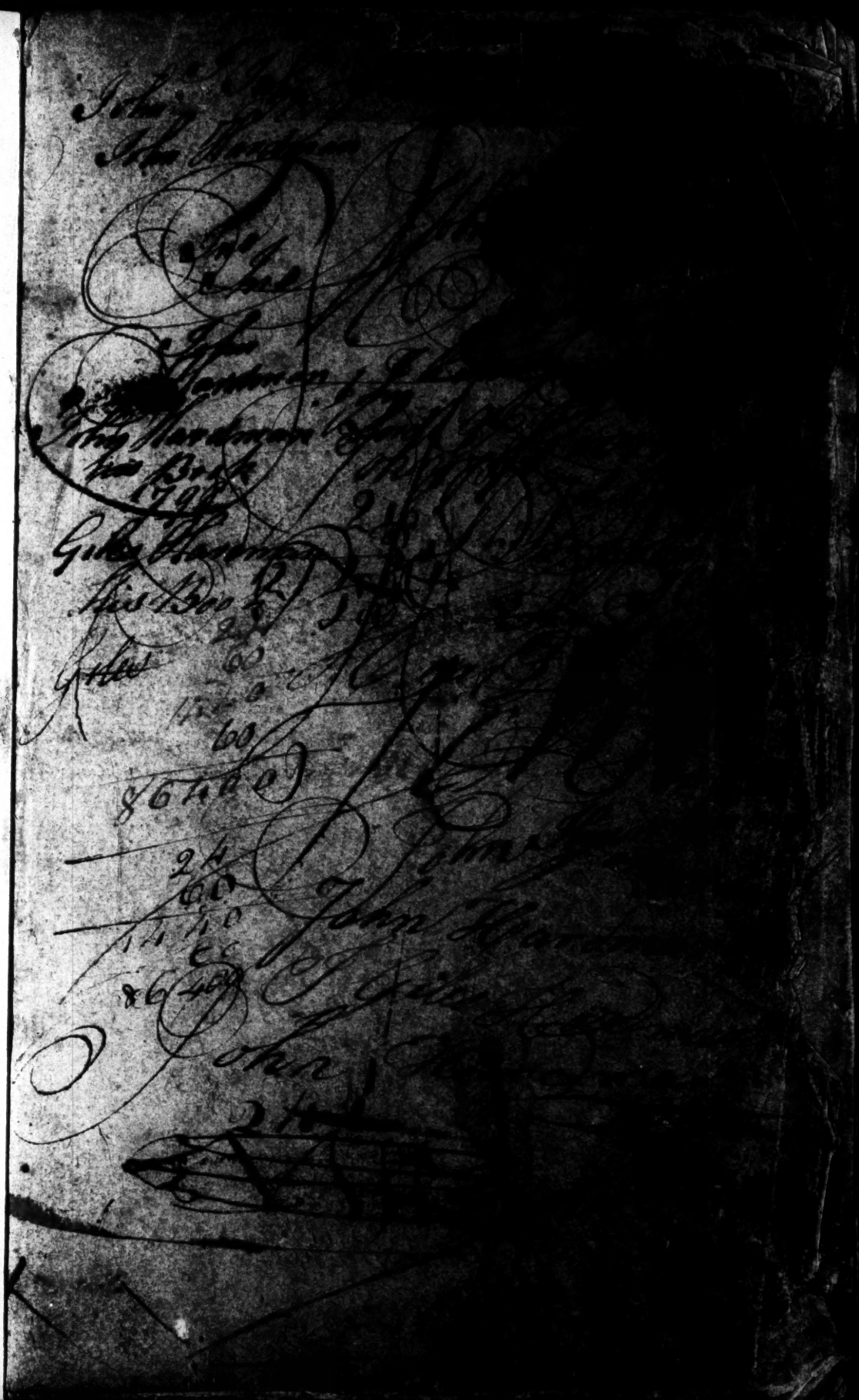

Scarce

John Hardman
Rockliffe Brought
Price 2/4

John Hardman Book

Rockliffe Brought

John Hardman Book

John

John Hardman Book
God give him grace on it to look
Not to look But understand
That Learning is better than
either Lands or Land

291

ARITHMETICK
MADE EASY,
In *Whole Numbers* and *Fractions*;
Both VULGAR and DECIMAL,
To the meaneſt CAPACITY.

Wherein the Rules and Demonſtrations are laid down in ſuch plain and regular Forms, that Youth may attain, by this Book alone, to be a compleat ARITHMETICIAN, without the Aſſiſtance of a Maſter: Wherein all the Rules for Merchandiſing are work'd with all the Plainneſs imaginable: With Tables calculated in *Whole Numbers*, ſhewing how much Sterling Money is contained in any Number of Crowns, Dollars, Ducats, Piaſtres, and Pieces of Eight, *Flemiſh*, from One to 3000 in Number; and from 3 *s.* 4 *d.* in Value, to 5 *l.* Sterling, riſing gradually by the Addition of one Penny; With ſeveral other uſeful TABLES.

LIKEWISE,

DECIMAL ARITHMETICK,

Work'd in a Way, never before publiſhed, in finding *Decimals* in a nearer and eaſier Method, than any hitherto: With a *Decimal-Table*, anſwering to all the Decimal Parts of a Pound, from the Fourth of a Farthing, to one Pound Sterling, riſing gradually by the Addition of one Farthing.

Alſo an *Appendix* of PRACTICAL MENSURATION of SUPERFICIES and SOLIDS.

The LIKE not EXTANT.

Intended only for the BENEFIT *of* YOUTH.

By *THOMAS MAYOH*,
WRITING-MASTER *and* ACCOMPTANT.

Peruſed and Approved of by ſeveral eminent Accomptants.
And Dedicated to the Merchants *and* Tradeſmen *of* Lancaſhire.

PRESTON:
Printed by J. STANLEY and J. MOON, [illegible]

John Harmon his

John Hardman Book

This is to give Notice,

THAT if any Perſon or Perſons, prints any Copy or Copies of this Book, unleſs it be from the Original Manuſcript, may expect being dealt with according to Law.

TO THE MERCHANTS AND TRADESMEN OF LANCASHIRE.

GENTLEMEN,

I PRESUME ſo far as to preſent you here with a Treatiſe of ARITHMETICK, and ſhall think my Pains well laid out, if it meet with Acceptance, and prove any way beneficial to you, or thoſe you may have any Concern with. I neither expect nor wiſh for much Intereſt by it; If I can be any way helpful to the Younger Minds in their being trained up for Trade and Buſineſs, which is the Life and Strength of our Nation; that is my higheſt Ambition, and what I ſhall always reflect upon with Pleaſure and Satisfaction. Modeſty forbids me to ſay any Thing in Behalf of

what I have done; and I would much rather have the Book to ſpeak for it ſelf; which I hope it will, if peruſed diligently, and judg'd of with Candour. This is what I, and every one that means well, has a Right to demand. And nothing is more unbecoming Men (and eſpecially Men of Genius) than to condemn without Trial, and wound without Occaſion given.

I hope, Gentlemen, it will give no Offence that my Book is uſhered into the World under your Patronage in general; for every generous Mind looks upon partial and fulſome Flattery with the higheſt Diſdain. I wou'd therefore wiſh that my Work may be ſo countenanc'd by you, as to have a free Entrance into the World: And that your Approbation may be according to the Advantage that is found to accrue from it, either to You or Yours.

I am,

GENTLEMEN,

Your moſt Obedient,

Humble Servant,

Turton, Auguſt 1ſt, 1751.

THOMAS MAYOH.

THE

PREFACE.

ANY one who writes a Book, ſeems, by Cuſtom, oblig'd to write a PREFACE to it: But to multiply many Words about the Uſefulneſs of a Book on this Subject, ſeems a Diſparagement of the Whole.

But to certify the Reader, I have made it my Study to go through the ſeveral Rules treated of in the enſuing Treatiſe, with all the Plainneſs imaginable; laid down General Rules and Demonſtrations for the reſolving of them, in the eaſieſt Method I could invent.

I have made that uſeful Rule to all Merchants, commonly called *Tare and Tret*, both in *Whole Numbers* and *Decimal Fractions*, as plain as poſſible; and valued the Goods mentioned, either by the Pound, Hundred, Hogſhead, or ſuch like, in all the Examples, in a moſt conciſe Method: And in giving the Anſwers, I have made it my Practice to reſolve them in ſuch a Way, that they may be underſtood by the meaneſt Capacity; neither ſtriving at too ſhort a Method, nor at too long a One, but

but in ſuch a Method as I thought might be moſt beneficial to the Reader.

I ſhould be very ungrateful if I did not own myſelf oblig'd to Mr. HILL's for *Arithmetical* and *Geometrical Progreſſion*, tho' I have made ſeveral Alterations and Improvements in them, and have made it evident, that any Queſtion proceeding from Unity, by a Double Ratio, may be known by Inſpection, having a Table of a Double Ratio, beginning with One, and ending with One Hundred and Forty-five, and ſaves the Trouble of large Multiplications, which are always required on that Occaſion; I have there made perfectly plain, and ſav'd that Trouble, by the Aſſiſtance of the ſaid Table.

I have made it my Buſineſs to treat of *Fractions*, both *Vulgar* and *Decimal*, in as plain a Way as poſſible, and proved *Whole Numbers* and *Fractions*, both *Vulgar* and *Decimal* together; That he who reads them with any Regard, can ſcarcely eſcape being made a perfect *Arithmetician*, without the Trouble and Charge of other Books.

I ſhall enlarge no more on the Commendations of this Book, but let it ſpeak for it ſelf: And if it do not give Satisfaction to the Reader, all that I can ſay in its Behalf, I am ſure, will never recommend it: But this I may (without Vanity) preſume to ſay, That whoever reads it over, will find more in it than the Title doth promiſe, or perhaps more than he expects. 'Tis true, indeed, the Dreſs is but plain and homely, it being wholy intended to inſtruct, and not to amuſe and puzzle, the

the young Learner with hard Words; nor is it my Ambition to be thought more learned or knowing than really I am, by writing in obſcure Terms. However, in this I ſhall always have the Satisfaction, that I have ſincerely aimed at what is uſeful, altho' in one of the meaneſt Ways. 'Tis Honour enough for me to be accounted as one of the under Labourers, in clearing the Ground a little, and removing ſome of the Rubbiſh that lies in the Way, to a right Knowledge of *Arithmetick*: How well I have performed that, muſt be left to proper Judges.

In fine, As I am not ſenſible of any fundamental Error in this Treatiſe, ſo I will not pretend to ſay it is without Imperfections: But if there be any Error, I hope the Reader will excuſe and paſs over it, with the like Candour and Good-will, that it was compoſed for his Uſe,

By his hearty Well-wiſher,

THOMAS MAYOR.

THE

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NUMERATION.

NUMERATION is that Rule which teacheth to read, write, or expreſs any Number ſet down or named.

The following Table muſt be got perfectly by Heart.

The TABLE.

6	4	7	8	7	6	4	2	3	Units . . 1
4	2	8	9	5	1	2	1		Tens . . 2 1
3	2	6	4	2	7	8			Hundreds . 3 2 1
2	1	7	3	2	8				Thouſands . 4 3 2 1
9	4	3	2	1					Tens of Thouſands . 5 4 3 2 1
1	7	4	9						Hundreds of Thouſands . 6 5 4 3 2 1
1	4	8							Millions . 7 6 5 4 3 2 1
7	2								Tens of Millions . 8 7 6 5 4 3 2 1
9									Hundreds of Millions . 9 8 7 6 5 4 3 2 1

The loweſt Line in the Table is read thus: Nine hundred eighty-ſeven Million, Six hundred fifty-four Thouſand, Three hundred and twenty-one.

And the uppermoſt Line of that on the Outſide the Table is read thus, 647 Million, 876 Thouſand, 423. The firſt Figure of any of theſe Three ſtands in the Hundreds Place.

And ſo of any other.

Any Number whatever given may be eaſily Numbered if you will but obſerve this one

GENERAL RULE.

Between every third Figure beginning to count at the Right Hand, ſet a Prick with your Pen, as underneath, and above the ſeventh Figure, which is the firſt Place of Millions, ſet a Figure of 1, and over the 13th Figure ſet 2, and over every Sixth Figure ſet one more, to denote how often Millions muſt be repeated; and by that Method you may number any Number or Sum required.

Number the following Sum.

2 1

7.437.689.512.786

Which in Words are, 7 Million of Millions, 437 Thouſand, 689 Million, 512 Thouſand, 786.

Let it be required to Number the following Sum.

6 5 4 3 2 1 *Millions repeated.*

324.743.689.401.706.470.873.246.400.740.720.420.907.423

Again.

9 8 7 6 5 4 3 2

4.210.346.707.890.974.325.689.984.236.466.781.207.428.914.

1 *Millions repeated.*

321.465.789.407.

By which Method you may Number as many as a Man can write in a Day, but there is never no Occaſion for ſuch a large Sum as this.

Addition of AVERDUPOISE-WEIGHT.

N. B. 16 Drams is one Ounce, 16 Ounces is one Pound, 28 Pounds is Quarter of a Merchant's Hundred, 4 Quarters is one Hundred, 20 Hundred is one Ton.

Tons	*C.*	*qrs.*	*lb.*	*oz.*	*dr.*		*Tons*	*C.*	*qrs.*	*lb.*	*oz.*	*dr.*
244	13	2	14	12	12		63	13	1	12	10	11
326	14	1	15	02	03		213	14	2	13	09	10
234	13	3	16	03	07		246	13	3	17	08	06
324	15	1	20	07	09		136	14	1	24	07	04
346	16	2	21	09	08		124	13	2	21	01	01
1477	14	0	04	03	07	Sum	1045	10	0	05	05	00

Having the Numbers placed as above, consider how many Units of the leaſt Denomination makes one of the next ſuperior Denomination, and that you muſt carry by that Line, and ſo by the next; and ſo on the Tables above are exactly ſo, which that you may find with a very little Trouble.

Addition of WINE MEASURE.

N. B. 4 Quarts is one Gallon, 63 Gallons is one Hogſhead, 4 Hogſheads is one Ton.

Tons	*hh's*	*gall.*	*qrs.*		*Tons*	*hh's*	*gall.*	*qrs.*
322	3	30	3		642	2	40	2
232	2	10	2		237	1	10	1
146	3	12	2		468	3	20	0
174	2	08	3		237	2	30	2
173	3	40	0		425	1	13	3
1049	2	39	2	Sum	2011	2	52	0

Additio

Addition of BEER MEASURE.

N. B. 2 Jills is one Pint, 2 Pints is one Quart, 2 Quarts is one Pottle, 2 Pottles is one Gallon, 9 Gallons is one Firkin, 2 Firkins is one Kilderkin, 2 Kilderkins is one Barrel.

Bar.	*kil.*	*fir.*	*gal.*	*pot.*	*qu.*	*pin.*	*jills.*
242	1	1	8	1	1	1	1
327	0	0	6	0	0	0	0
246	1	0	4	1	1	0	1
467	0	1	2	0	0	1	0
743	1	1	3	1	1	0	1
2027	1	1	7	1	0	1	1

Addition of ALE MEASURE.

N. B. 2 Pints is one Quart, 4 Quarts is one Gallon, 32 Gallons is one Barrel.

Bar.	*gal.*	*qu.*	*pin.*	*Bar.*	*gal.*	*qu.*	*pin.*
323	30	3	1	426	30	2	1
214	10	2	1	236	10	1	1
236	13	1	0	463	20	3	0
323	10	3	1	236	10	2	1
1246	17	2	1	217	30	3	1
323	14	1	0	327	10	2	0
1668	01	2	0 Sum	1908	17	3	0

Addition of DRY MEASURE.

N. B. 4 Gallons is one Peck, 4 Pecks is one Buſhel, 8 Buſhels is one Quarter, 5 Quarters is one Wey, and 2 Weys is one Laſt.

laſts.	*weys.*	*qrs.*	*buſh.*	*peck.*	*gall.*
326	1	4	7	3	0
239	0	3	6	2	1
246	1	2	5	3	1
326	0	1	4	2	1
389	1	0	3	1	1
1528	1	3	4	1	0

Addition of LONG MEASURE.

N. B. 3 Barly Corns in Length is one Inch, 12 Inches is one Foot, 3 Feet is one Yard, 5½ Yards is one Pole, 40 Poles is one Furlong, 8 Furlongs is one Mile.

miles	*fur.*	*pol.*	*yards*	*feet*	*inch.*	*bar. cor.*
364	7	30	4	2	10	2
236	6	10	2½	1	02	1
276	4	20	2¼	2	08	2
327	5	10	3¼	1	07	1
423	2	30	2½	2	05	2
742	3	20	4	1	02	1
2371	6	04	1	0	01	0

Addition of CLOTH MEASURE.

N. B. 4 Nails is one Quarter of a Yard, 3 Quarters is one Ell *Flemiſh*, 5 Quarters is one Ell *Engliſh*, 6 Quarters is one Ell *French*.

Ell Fl.	*qrs*	*nails*	*Ell Eng.*	*qrs*	*n.*	*Ell Fr.*	*qrs*	*n.*
324	2	3	234	3	3	264	5	3
236	1	2	236	4	1	323	4	2
427	2	1	274	1	2	678	2	1
146	1	1	371	3	1	789	3	2
1135	1	3	1117	2	3	2056	4	0

TIME.

N. B. 60 Seconds is one Minute, 60 Minutes is one Hour, 24 Hours is one Day, 7 Days is one Week, 4 Weeks is one Month, 12 Calender Months is one Year; or 52 Weeks 1 Day and 6 Hours is one Year.

Years	*mon.*	*w.*	*d.*	*h.*	*m.*	*ſec.*
326	11	3	6	20	30	20
672	10	2	4	10	10	10
736	08	3	2	10	20	30
327	06	1	1	14	30	50
346	07	2	2	12	40	30
271	08	3	3	10	30	25
Sum 2682	06	1	0	06	42	45
Reſt 2355	06	1	0	10	12	25
Proof 2682	06	1	0	06	42	45

TABLES

TABLES *of both* COIN, WEIGHT *and* MEASURES.

ENGLISH COIN.

4 Farthings is one Penny	*In a Pound Ster. are*	960 Farthings.
12 Pence is one Shilling,		240 Pence.
20 Shillings is one Pound.		80 3 Pence's.
		60 Groats.

TROY WEIGHT.

32 Grains of Wheat, or 24 Artificial Grains is one Penny-weight.	*In a Pound of Troy are*	5760 Grains.
		240 Pen. Wts.
20 Pen. Wts is one Ounce.		12 Ounces.
12 Ounces is one Pound.		

AVERDUPOISE WEIGHT.

4 Qrs of a Dram is 1 Dram	*In one Ton are,*	
16 Drams is one Ounce,		573440 Drams.
16 Ounces is one Pound,		35840 Ounces.
28 Pounds is Qr. of 112 *lb.* the Hundred.		2240 Pounds.
		80 Quarters.
20 Hundred is one Ton,		20 Hund. of 112 *lb* to the Hun.
19½ Hundred is one Ton of Lead.		

Note, That 56 *lb.* is one Half, and 84 *lb* is ¾ Quarters of 112 *lb.* by which moſt of Merchants Commodities are ſold.

APOTHECARIES WEIGHT.

20 Grains is one Scruple,	*In a Pound.*	5760 Grains.
3 Scruples is one Dram,		288 Scruples.
8 Drams is one Ounce,		96 Drams.
12 Ounces is one Pound.		12 Ounces.

Sheep's-Wool Weight.

7 Pound is one Clove,	*In one Laſt are,*	4368 Pounds.
2 Cloves is one Stone,		624 Cloves.
2 Stone is one Tod,		312 Stones.
6½ Tod is one Wey,		156 Tods.
2 Weys is one Sack,		24 Weys.
12 Sacks is one Laſt.		12 Sacks.

According to the Standard of the Exchequer, by the 31 *Edw.* iii. *Ch.* viii. xiii. *Ri.* ii. *Ch.* ix. 26 Stone, of 14*lb.* each, is one Sack, or 364 Pound.

Wine Measure.

4 Quarts, or 231 ſolid Inches is one Gallon.	*In one Ton are,*	6 Tierce, or 252 Gallons.
42 Gallons is one Tierce,		4 Hogſheads.
1½ Tierce, or 63 Gallons is one Hogſhead,		and
2 Hog. is one Pipe or Butt,		2 Pipes or Butts.
2 Pipes is one Ton.		

Note, Honey and Oyl are meaſured by this Meaſure.

Beer Measure.

2 Pints is one Quart,	*In a Barrel are,*	288 Pints,
2 Quarts is one Pottle,		144 Quarts.
2 Pottles, or 282 ſolid Inches is one Gallon,		72 Pottles.
		36 Gallons.
9 Gallons is one Firkin,		10152 ſolid Inches
2 Firkins is one Kilderkin,		4 Firkins.
2 Kilderkins is one Barrel.		2 Kilderkins

Note, That 1½ Barrel, or 54 Gallons in one Hogſhead of Beer.

Ale

ALE MEASURE.

2 Pints is one Quart,	In a Barrel are,	256 Pints.
2 Quarts is one Pottle,		128 Quarts.
2 Pottles, or 282 ſolid Inches is one Gallon,		64 Pottles.
		32 Gallons.
8 Gallons is 1 Firkin of Ale, Herring or Soap,		9024 ſolid Inches
		4 Firkins.
2 Firkins is one Kilderkin,		2 Kilderkins.
2 Kilderkins is one Barrel.		

DRY MEASURE.

2 Pints is one Quart,	In one Laſt are,	5120 Pints.
2 Quarts is one Pottle,		2560 Quarts.
2 Pottles is one Gallon,		1280 Pottles.
2 Gallons is one Peck,		640 Gallons.
4 Pecks is one Buſhel, Corn Meaſure,		320 Pecks.
5 Pecks is one Buſhel, Water Meaſure,		80 Buſhels.
8 Buſhels is one Quarter,		10 Quarters.
4 Quarters is one Chaldern,		2 Weys.
5 Quarters is one Wey,		
2 Weys is one Laſt.		

Note, That 36 Buſhels is a Chaldern of Sea Coal, by the 16 and 17 of *Car.* ii. Chap. 2.

DOZENS.

12 Pieces, or Things, is one Dozen,	In a great Groſs,	12 Small Groſs
12 Doz. is one ſmall Groſs,		144 Dozen.
12 Small Groſs is one great Groſs.		1728 Pieces, or Things.

LONG

LONG MEASURE.

3 Barly Corns is one Inch,	In one Mile are,	190080 Bar. Corns
12 Inches is one Foot,		63360 Inches,
3 Foot, or 16 Nails is one Yard,		5280 Feet,
45 Inches is one Ell *Englisb*		1760 Yards,
27 Inches is one Ell *Flemisb*		320 Poles or Perches,
2 Yards is one Fathom,	In one	8 Furlongs.
5½ Yards is one Pole or Perch,		
40 Perches is one Furlong,		
8 Furl. is one *Engl.* Mile.		

TIME.

60 Thirds is one Second,	In one Year are,	31557600 Seconds
60 Seconds is one Minute,		525960 Minutes,
60 Minutes is one Hour,		8766 Hours,
24 Hours is 1 Day natural,		365 Days, and
7 Days is one Week,		6 Hours.
4 Weeks is one Month,		
13 Months 1 Day and 6 Hours is one Solar Year.		

Note, That from the Time the Sun leaveth one Tropick, to the Time it returns to that Tropick, is 365 Days, 5 Hours, 49 Minutes, 4 Seconds and 21 Thirds.

MOTION.

MOTION.

60 Seconds maketh one Minute,
60 Minutes, or Miles, or 4 Minutes of Time, is one Degree.
30 Degrees is one Sign of the Zodiack.
3 Signs, or 90 Degrees, is one Quadrant.
4 Quadrants, or 360 Degrees, is one Circle of the Sphere.

Square or Superficial Meaſure.

16 Quarters of an Inch is one Inch,
144 Inches is one Foot,
9 Feet is one Yard,
30¼ Yards one Pole Statute
40 Poles Long and one Broad, is 1 Rood Land, or Qr. of an Acre.
4 Square Rood is 1 Acre,
640 Acres is 1 Square Mile.

In one Square Mile are.

4014480600 Sq. Inches
27878400 Feet,
3097600 Yards,
102400 Poles,
2560 Roods,
640 Acres.

SUBTRACTION.

SUBTRACTION.

SUBTRACTION teacheth to take a leſſer Number from a greater, and to know the Remainder or Difference.

1st			3rd		
l.			l.	s.	d.
3246432	Borrowed		236	13	10 ½
1743821	Paid		139	15	11 ¼
1502611	Reſts		96	17	11 ¼
3246432	Proof		236	13	10 ½
2374267	Debtor		239	18	11 ¾
1487346	Creditor		198	14	09
886921	Ballance		41	04	02 ¾
2374267	Proof		239	18	11 ¾

The higher Queſtion towards the Left Hand, ſay, 1 from 2, reſt 1, which ſet down; then 2 from 3, reſt 1, which ſet down; then 8 from 4 I [illegible] but you muſt borrow one from the next Figure, which makes the 4 into 14, and 8 from 14 reſt 6, then 1 I borrow'd and 3 is 4; 4 from 6 reſt 2, then 4 from 4 reſts 0, which ſet down 0; then 7 from 2 I cannot, but 7 from 12, reſt 5; then 1 I borrowed and one is 2, 2 from 3 reſt 1, which ſet down, and the Work is done, and ſo of any other of one Denomination.

Suppoſe

Subtraction of MONEY.

	l.	*s.*	*d.*	*far.*
Suppoſe *James Smith* lent to *John Low*	24	13	6	1/4
And the ſaid *John Low* has paid him again	15	18	3	2/4
I demand what is due to James Smith?				
Anſwer	8	15	2	3/4

Which to perform do thus; ſay, 3 Farthings from 2 Far. I cannot, but 3 Far. from one Penny and there remains 1/4 and 1/2 is 3 Farthings, which ſet down 3/4, and carry the Penny that you borrowed to the Pence, and ſay, 1 I borrow'd and 3 is 4, 4 from 6 and there remains 2 Pence, which ſet down, and ſay, 18 Shillings from 13 Shillings I cannot, but 18 Shillings from 20, or one Pound, and there remains 2 s. and 13 s. is 15 Shillings, which ſet down and carry one to the Pound, and ſay, 1 I borrow'd and 5 is 6, 6 from 4 I cannot, but 6 from 10 reſt 4 and 4 is 8, which ſet down; then 1 I borrow'd and 1 is 2, 2 from 2 reſt 0, and the Work is done.

By which you find that *John Low* remains indebted to *James Smith* in the Sum of 8 *l.* 15 *s.* 2 *d.* 3/4; and ſo any other of Money; which to prove it, add what he owes to what he has paid, and if it equal the Sum he borrow'd, the Work is Right, which that to do, try by Addition, which is there taught.

Subtraction of divers Denominations.

	l.	*s.*	*d.*
Lent to *William Wantmoney*	200	10	00
	24	10	06
Received from him at	13	11	04
fundry Times,	14	11	11 ½
	37	12	10 ½
	14	17	10
Received of *Will. Wantmoney* in all,	105	14	06
Remains due,	94	15	06
The Sum of what is paid and due,	200	10	00

	10 *C.*	4 *qrs.*	28 *lb.*
From	44	2	14
Take	36	3	13
Reſt	7	3	01
Proof	44	2	14

	10 *Tons*	20 *C.*	4 *qrs.*	28 *lb.*	16 *oz.*
From	43	13	1	14	12
Take	32	14	2	12	08
Reſt	10	18	3	02	04
Proof	43	13	1	14	12

	10 *lb.*	12 *oz.*	20 *dwts.*	24 *gr.*
	423	10	14	21
	176	08	10	19
	247	02	04	02
	423	10	14	21

	10 *oz.*	20 *dwts.*	24 *gr.*
From	426	18	13
Take	389	19	22
Reſt	36	19	15
Proof	426	18	13

And ſo much for *Subtraction*, which will ſerve for any Denomination, with the Help of the Tables in *Addition*.

Queſtions

Questions to Exercise SUBTRACTION.

In 15 Hundred 62 there died a noble Prince; How many Years is it ago, that is, how many since?

The present Year	1751
The Year he died	1562
The Years since	189

A Book printed, a Church built, a Child born, a Lease granted, or any Thing done in the Year of our Lord 1692, How old is it this present Year?

	1751
	1692
Answer	59 Years since.

From Ninety take 30, from 40 take Ten, Subtract 6 from 60, and what remains then?

Answer 144

	Years. m. w. d. h. min.
Suppose a Boy bound an Apprentice for	10 0 0 0 00 00
And has served	9 9 9 9 09 00
How long has he to serve?	
Answer, He has to serve	1 4 14 [illegible]

MULTIPLICATION.

THIS Rule, called MULTIPLICATION, is the moſt ſerviceable for Buſineſs of any Rule in Arithmetick; as I ſhall ſhew by its Nature, Quality, and Uſe

In this Rule, obſerve Three Things.

1. The *Multiplicand*, generally the Greater of the Two Numbers, and is the Number to be Multiplied.

2. The *Multiplier*, generally the Leſſer of the Two Numbers, and is the Number to Multiply with.

3. The *Product* is the Anſwer or Reſult of the Work.

Likewiſe, *Multiplication* is a Contraction of *Addition*, for what *Addition* performs by adding, *Multiplication* does perform expeditiouſly by Multiplying.

Example. Multiply 36 by 3, Thus

36		36
36		3
36	By Multiplication,	108
108	By Addition the ſame.	

But before any Procedure can be made in this Rule, the following Table muſt be got perfectly by Heart, before the Rule can be underſtood to Perfection, or worked without Sight of the Table.

The

The TABLE.

	2		4
	3		6
	4		8
	5		10
2 Times	6	is	12
	7		14
	8		16
	9		18
	3		9
	4		12
	5		15
3 Times	6	is	18
	7		21
	8		24
	9		27
	4		16
	5		20
	6		24
4 Times	7	is	28
	8		32
	9		36
	5		25
	6		30
5 Times	7	is	35
	8		40
	9		45
	6		36
	7		42
6 Times	8	is	48
	9		54
	7		49
7 Times	8	is	56
	9		63
8 Times	8	is	64
	9		72
9 Times	9	is	81
	2		24
	3		36
	4		48
	5		60
	6		72
12 Times	7	is	84
	8		96
	9		108
	10		120
	11		132
	12		144

MULTIPLICATION and DIVISION ought to be learned together, for they are a ſure Proof of each other all the Ways taught; beſides, are ſubject to Error: So for that Reaſon, I ſhall make it my Practice to teach them both together, which will be great Advantage to the underſtanding of both Rules.

Let it be required to Multiply 235 by 3; or, what is the Price of 235 Bags of Hops, at 3 Pounds ℔ Bag?

Thus 235 Multiplicand.
3 Multiplier.

Anſwer 705 Product.

Begin and ſay thus, 3 Times 5 is 15, ſet down 5 and carry 1; and 3 Times 3 is 9 and 1 is 10; ſet down 0 and carry 1; and 3 Times 2 is 6 and 1 is 7, which makes 705 as in the Margin.

More Examples performed the ſame Way.

Admit	425	729	892	6742 were
Multiplied	3	4	5	6
Product	1275	2916	4460	40452

Admit	6423	7894	8642 were
Multiplied	7	8	9
Product	44961	63152	77778

DIVISION.

DIVISION teacheth to Divide or Separate any Number or Quantity into as many Parts as you please.

A GENERAL RULE.

Diviſion ſhews how oft the Dividend
Does in the Diviſor comprehend,
Firſt aſk how oft in Anſwer Quotient make,
Next Multiply, Subtract, a new Dividual take.

Likewiſe, *Diviſion* is a Contraction of a Subtraction, for what Subtraction performs by Subtraction, Diviſion performs very quickly by Dividing.

Ex. Divide me the Number 12 by 4, thus.

12	4 | 12 | 3 Times.
4 ſub.	12
8	0 By Diviſion.
4 ſub. By Subtraction.	
4	
4 ſub.	
0	

In MULTIPLICATION *the Proportion is,*
As an Unit is to the *Multiplicator,*
So is the *Multiplicand* to the *Product.*

In DIVISION *the Proportion is,*
As an Unit is to the *Diviſor,*
So is the *Dividend* to the *Quotient.*

Admit 705 Pounds were to be divided among 3 Men, what is each Man's Share?

3 | 705 | 235
6
10
9
15
15
0

Say, How oft 3 can I have in 7, ſay 2 Times, and ſet 2 in the Quotient, and multiply your Diviſor by it, ſaying, 2 Times 3 is 6; which 6 ſet down under the 7, and ſubtract the 6 from 7 and 1 remains; to which bring down the next Figure which is a Cypher, which makes the 1 into 10, Then ſay, the Three's in 10, *anſwer*, 3 Times, and multiply your Diviſor as before, ſaying, 3 Times 3 is 9, which 9 ſet under the 10, and ſubtract 9 from 10 and 1 remains, to which bring down the laſt Figure which is 5, which makes 15, and ſay, 3's in 15, -- 5 Times 3 is 15, which ſet down, and ſubtract, and 0 remains, and the Work is done; and the Proof of the firſt Queſtion in *Multiplication* after the Table.

The Proofs of the other Queſtions in Multiplication.

	3	4	5	6
Divide	1275 by 3	2916 by 4	4460 by 5	40452 by 6
	427 Anſwer.	729 Anſ.	892 Anſ.	6742 Anſ.

	7	8	9
Divide	44961 by 7	63152 by 8	77778 by 9
	6423 Anſw.	7894 Anſ.	8642 Anſ.

Multiply

Multiply me 3272
by 14

13088
3272

45808 Product

Mul. me 32742
by 24

130968
65484

785808

Mul. me 3742
by 325

18710
7484
11226

Product 1216150

Mul. me 6789
by 1798

54312
61101
47523
6789

Product 12206622

Multiply me 643998 Multiplicand
by 974842 Multiplicator.

1287996
2575992
5151984
2575992
4507986
5795982

627796298316 Product.

Divide me 45808 by 14.

Divif Divid. Quotient.

14 | 45808 | 3272 Proof of the oppoſite Queſtion.

42

38

28

100

98

28

28

0

Divide me 785808 by 24

24 | 785808 | 32742 Quotient.

72

65

48

178

168

100

96

48

48

0

Divide me 12206622 by 1798.

1798 | 12206622 | 6789, Quotient.

10788

14186

12586

16002

14384

16182

16182

00

Divide me 1216150 by 325

325 | 1216150 | 3742 Quo.

975

2411

2275

1365

1300

650

650

00

Divide

Divide 6277962983 16 by 974842

974842 | 6277962983 16 | 643998 Quotient.
5849052

4289109
3899368

3897418
2924526

9728923
8773578

9553451
8773578

7798736
7798736

00

A TABLE *to the Question, which is very neceſſary when the Queſtion is difficult.*

1	974842
2	1949684
3	2924526
4	3899368
5	4774210
6	5849052
7	6823894
8	7798736
9	8773578

What's the Value of 3 Bags of Cotton, at

l.	s.	d.	
3	2	9	℔
		3	Mul.
L. 9	8	3	Anſ.

What's the Value of 9 Pounds of Butter at

d.	
3 ½	℔
9	Mul.
Sh. 2	7 ½ Anſ.

What's the Value of 12 Yards of Cloth, at

s.	d.	
4	6	℔
	12	Mul.
L. 2	14	0 Anſ.

What's the Value of 15 Yards of Plain, at

s.	d.	
3	6	℔
	5	& 3
	17	6
		3
L. 2	12	6 Anſ.

What's the Value of 21 Gallons of Brandy, at

s.	d.	
5	11	℔
	7	& 3
2	1	5
		3
L. 6	4	3 Anſ.

Theſe two laſt are multiplied by the Ratio's of 15 and 21, for 3 Times 5 is 15, and 7 Times 3 is 21; and ſo for any other.

3 Bags

3 Bags of Hops at $\frac{1}{3}$ | 9 *l.* 8 *s.* 3 *d.* what will 1 coſt?

L. 3 2 9 Anſwer.

9 *lb.* Butter at $\frac{9}{1}$ | 2 *s.* 7 *d.* $\frac{1}{2}$ what will 1 coſt?

3 *d.* $\frac{1}{2}$ Anſwer.

12 Yards of Cambrick at $\frac{1}{12}$ | 2 *l.* 14 *s.* 0 *d.*

what will 1 coſt? 4 *s.* 6 *d.* Anſ.

15 Yards of Kerſey at $\frac{1}{3}$ | 2 *l.* 12 *s.* 6 *d.*

what will 5 coſt? $\frac{5}{1}$ | 17 6 for 5 Yds.

Sh. 3 6 Anſwer.

21 Gallons of Brandy at $\frac{1}{3}$ | 6 *l.* 4 *s.* 3 *d.*

what will 1 coſt? $\frac{7}{1}$ | 2 1 5 for 7 Gall.

5 11 Anſwer.

Theſe Queſtions are the Proofs of the Oppoſites, and may be underſtood very well without any Explanation, but conſidering the Ratio's which may be eaſily found by *Multiplication Table*; and whenever the Ratio's cannot be exactly found, you may multiply the Given Number by as many as the laſt Product wants, and add it to that Product, and the Work is done.

What

What's the Value of 30 Buſhes of Wheat, at - - - { s. d. 3 9 ℔ 6 & 5

1 2 6
5

Anſwer L. 5 12 6

What's the Value of 36 Hund. of Cheeſe, at - - - { l. s. d. 1 2 6 ℔ 6 & 6

6 15 0
6

Anſwer L. 40 10 0

What's the Value of 96 Hundred of Sugar, at - - - { l. s. d. 2 13 6 ℔ 12 & 8

32 2 0
8

Anſwer L. 256 16 0

What's the Value of 144 Pound of Indico, at - - - { s. d. 7 8 ℔ 12 & 12

4 12 00
12

Anſwer L. 55 4 00

What's the Value of 26 ½ Hundred of Pepper, at - - { l. s. d. 2 3 9 ℔ 6 & 4

13 2 6
4

52 10 0
4 7 6
1 1 10½

Anſwer L. 57 18 4½

30 Buſhels of Wheat at 5 | 5 *l.* 12 *s.* 6 *d.*

what will 1 coſt? 6 | 1 2 6

Anſwer 3 9 ℔

---

36 Hundred of Cheeſe at 6 | 40 *l.* 10 *s.* 0 *d.*

what will 1 coſt? 6 | 6 15 0

Anſwer *L.* 1 2 6 ℔

---

96 Hundred of Sugar at 8 | 256 *l.* 16 *s.* 0 *d.*

what will 1 coſt? 12 | 32 2 0

Anſwer *L.* 2 13 6 ℔

---

144 Pound of Sugar at 12 | 55 *l.* 4. 0 *d.*

what will 1 coſt? 12 | 4 12 0

Anſwer *L.* 0 7 8 ℔

---

26 ½ Hundred of Pepper at 57 *l.* 18 *s.* 4 ½

what will 1 coſt? 5 08 4 ½ ſubt.

4 | 52 10 0

6 | 13 2 6

Anſwer *L.* 2 3 9 ℔

Multiply

	l.	*s.*	*d. f.*	
Multiply me	19	17	$2\frac{1}{2}\ \frac{1}{8}$	by 8.
			8	
L.	158	17	$7\frac{1}{4}$	Anſwer

	l.	*s.*	*d.*	
Multiply me	27	18	$9\frac{3}{4}$	by 12.
			3 & 4	
	83	16	$5\frac{1}{4}$	
			4	
L.	335	05	9	Anſwer.

	l.	*s.*	*d.*	
Multiply me	214	13	$6\frac{1}{2}$	by 24.
			4 & 6	
	858	14	2	
			6	
L.	5152	05	0	Anſwer.

	l.	*s.*	*d.*	
Multiply me	24	13	4	by 36.
			6 & 6	
	148	00	6	
			6	
L.	888	00	0	Anſwer.

Divide

Divide me 8 | l. 158 s. 17 d. 7¾ among 8 Men.

L. 19 17 2¼ ¼ Answer.

Divide me 12 | l. 338 s. 65 d. 9 among 12 Men.

3 | 28 16 5¼

L. 27 18 9¼ Answer.

Divide me 6 | l. 5152 s. 05 d. 0 among 24 Men.

4 | 858 14 2

L. 214 13 6½ Answer.

Divide me 6 | l. 888 s. 00 d. 0 among 36 Men.

6 | 148 00 0

L. 24 13 4 Answer.

REDUCTION.

REDUCTION is a Rule conſiſting of two Parts, *viz.* The reducing of a Number from a Greater to a Leſſer Denomination, as Pounds into Shillings, Hundreds into Pounds, Yards into Feet, and ſuch like; which is called *Reduction Deſcending*, and is performed by

MULTIPLICATION.

The Reducing of a Number from a Leſſer to a Greater, Name or Denomination, as Feet into Yards, Gallons into Barrels, Farthings into Pounds, *&c.* which is called *Reduction Aſcending*, and is performed by

DIVISION.

So that all Queſtions in REDUCTION are reſolved either by MULTIPLICATION or DIVISION, or by both; which ſhall be further explained by the Queſtions following.

A GENERAL RULE.

Reduction ſhews how we have Names in Uſe,
May Great to Small, and Small to Great reduce;
So that the Number which ſhall thence ariſe,
The Given Sum in Value equalize:
Multiply or *Divide* it back you muſt,
Which brings again your Given Number juſt.

In

In 296 Pounds, how many Pence?

20
5920 Shillings.
12
71040 Pence.

Or thus,

L.
296
240 *Pence in 1 P.*
11840
592
As before, 71040 Pence.

In 71040 Pence, how many Pounds Sterling?

12 | 71040 | 592 | 0 | 296
60 | 4
110 | 19
108 | 18
24 | 12 *Answer* 296 *l.*
24 | 12 *both Ways.*
0 | 0

Or thus,

240 | 71040 | 296
480
2304
2160
1440
1440
00

In *l.* 24 *s.* 13 *d.* 4 ½ how many Farthings?

20
493
12
5920
4
23682

4 | 23682
12 | 5920 ½
493 4

Answer 24 13 4 ½ Proof.

l. *s.* *d.*

In 242 13 4 How many Pieces of Eight, at 4 *s.* 6 *d.* ℔ Piece?

l.	*s.*	*d.*
242	13	4
240		
9680		
484		
58080		
160	Pence in 13 *s.* 4 *d.* added in.	

s.	*d.*
4	6
12	
54	

54 | 58240 | 1078 Pieces of Eight.

54

424

378

460

432

28

In 1078 $\frac{18}{54}$ Pieces of Eight, how many Pounds, Shillings, and Pence Sterling?

1078 $\frac{18}{54}$

54

4320

5392

12 | 58240

		d.
2	0 | 485	3 4

Anſwer 242 13 4 and Proof.

Thus you ſee, Foreign Coins and Exchanges may be reduced to Sterling Money; and on the Contrary, Sterling Money to Foreign; as ſhall be ſhewn in the Queſtions following.

Venice

Venice remits to *London* 248 *Venetian* Ducats *de Banco*: The Exchange at 52 *d.* ℔ Ducat, Sterling, What muſt be drawn at *London*?

248 Ducats *de Banco*.
52 Pence in one Ducat.

496
1240

12 | 12896

2|0 | 107|4 8

Anſwer *L.* 53 14 8 To be drawn at *London*.

London remits to *Venice* 53 *l.* 14 *s.* 8 *d.* Sterling: The Exchange at 52 *d.* ℔ *Venetian* Ducat *de Banco*, What Number of Ducats muſt be drawn at *Venice* for this Remittance?

l.	*s.*	*d.*
53	14	8
20		
1074		
12		

52 | 12896 | 248 *Venetian* Ducats *de Banco*
104 to be drawn at *London*.

249
208

416
416

00

Amſterdam

Amſterdam remits to *Liverpool* 534 *l.* 16 *s.* 4 *d.* *Flemiſh*: The Exchange at 33 *s.* 4 *d.* *Flemiſh*, for the 20 Shillings Sterling, What muſt be drawn at *Liverpool* for this Remittance?

534 *l.* 16 *s.* 4 *d.* — 33 *s.* 4 *d.*

20 — 12

10696 — 400

12

L. *s.* *d.*

4|00 | 1283|56 | 320 17 9 $\frac{1}{2}$ $\frac{160}{400}$ = $\frac{2}{5}$

356

20

4|00 | 71|20 | 17

320

12

4|00 | 38|40 | 9

240

4

4|00 | 9|60 | $\frac{1}{2}$

8

160

Thus *Flemiſh* Money will be brought to Sterl. when the Exchange is at 33 *s.* 4 *d.*

	l.	*s.*	*d.*
	534	16	4
Mul. by			3
Divide 5	1604	09	0
Anſwer	320	17	9 $\frac{1}{2}$ $\frac{2}{5}$

The Contrary.

	l.	*s.*	*d.*	*f.*
	320	17	9	$\frac{1}{2}$ $\frac{2}{5}$
			5	
3	1604	09	0	
L.	534	16	4	

This Proportion is as 3 is to 5, ſo is 240 *d.* Sterling to 400 *d.* *Flemiſh*.

In

In 428 *French* Crowns, at 54 *d.* ¼ Sterling, how many Pounds Sterling.

4
217 Farth. in 1 Crown.

428 French Crowns.
217 Farthings in 1 *French* Crown.

2996
428
856
4 | 92876
12 | 23219
2|0 | 193|4 11
Answ. 96 14 11

In 96 *l.* 14 *s.* 11 *d.* howmany French Crowns at 54 *d.* ¼ ℔

96 14 11 — 54 ¼
20 — 4
1934 — 217
12
23219
4
217 | 92876
Answer 428 French Crowns.

In 268 Dollars at 52 *d.* ⅘ Sterling, How many Pounds, Shillings, &c. Sterling.

268 Dollars.
52
536
1340
13936
167 ½ added for ⅘th.
12 | 14103 ½
2|0 | 117|5=3
58 15 3 ½ Sterling Money due for 268 Dollars, at 52 ⅘ ℔

268
5
8 | 1340
167=⅘ ½

In

In 242 Pounds Sterling, I demand how many Marks, Nobles, Crowns, and Half Crowns; and of each an equal Number.

242 Pounds.
Sixpences in a Po. 40

55 | 9680 | 176 *of all Sorts.*
55
418
385
330
330
00

	s.	*d.*
A Mark is	13	4
A Noble is	6	8
A Crown is	5	0
½ Crown is	2	6
	27	6
	2	

Anſw. Sixpences 55

176 Marks. ⅓ | 176 Nobles. ¼ | 176 Crowns.
2
3 | 352
L. 117 ⅓ = 6 8

L. 58 ⅔ = 13 4 *L.* 44

⅛ 176 Half Crowns.
L. 22.

176	Marks makes	117	6	8
	Nobles makes	58	13	4
	Crowns makes	44	0	0
	½ Crowns makes	22	0	0
	Anſwer *L.*	242	0	0

N. B. A Mark is ⅔ of a Pound. A Noble is ⅓. A Crown is ¼. A Half Crown is ⅛ of a Pound; and this Queſtion is work'd ſo.

In

Of AVERDUPOISE WEIGHT.

C. qrs. lb. oz.

In 242 2 14 12 How many Ounces?

4

970 Qrs.
28

7764
1941

27174 lb.
16

163046
27175

Anſ. 434796 Oun.

In 434796 Ounces, how many Hundreds, Quarters, Pounds and Ounces.

	28	4	C. qr. lb. oz
16) 434796)	27174)	970 (	242 2 14 12
32	252	8	as before.
114	197	17	
112	196	16	
27	14	10	
16		8	
119		2	
112			
76			
64			
12			

In One Ton Weight, how many Drams?

20 Hundred is one Ton.
4 Quarters is one Hundred.

80 Quarters in one Ton.
28 Pounds is one Quarter.

640
160

2240 Pounds in one Ton.
16 Ounces in one Pound.

13440
2240

35840 Ounces in one Ton.
16 Drams in one Ounce.

573440 Drams in one Ton.

Of TROY WEIGHT.

In One Pound *Troy* Weight, how many Grains?

12	Ounces is one Pound.
20	Pennyweights is one Ounce.
240	Pennyweights in one Pound.
24	Grains is one Pennyweight.
960	
480	
5760	Grains in one Pound, *Troy* Weight.

N. B. 32 Natural Grains of Wheat, or 24 Artificial Grains is one Pennyweight.

	lb.	*oz.*	*dwts.*	*gra.*	
In	32	11	14	12	How many Grains.
	12				Ounces in one Pound.
	395				Ounces.
	20				Pennyweights is one Ounce.
	7914				Pennyweights.
	24				Grains is one Pennyweight.
	31698				
	15829				
	189988	Grains.			

In 189988 Grains, how many Pounds, Ounces, Pennyweights and Grains?

24 | 189988

2|0 | 791|4 12

12 | 395 14

Anſwer. 32 11 14 12

Of

Of APOTHECARIES WEIGHT.

In One Pound *Apothecaries Weight*, how many Grains?

12 Ounces is one Pound.
8 Drams is one Ounce.

96 Drams is one Pound.
3 Scruples is one Dram.

288
20 Grains is one Scruple.

5760 Grains in one Pound *Apothecaries Wt.*

	lb.	*oz.*	*ſcr.*	*gr.*
In	24	08	2	14 How many Grains?

12

296 Ounces.
3 Scruples is one Ounce.

890 Scruples.
20 Grains is one Scruple.

17814 Grains.

In 17814 Grains, How many Pounds, Ounces, Scruples and Grains?

2|0 | 17814

3 | 890 14 Grains.

12 | 296 2 Scruples.

Anſwer 24 8 2 14 as before.

Of Sheeps-Wool Weight.

In One Laſt of Wool, How many Pounds?

12 Sacks is one Laſt.
2 Weys is one Sack.

$\frac{2}{3}$ | 24 Weys.
6 $\frac{1}{3}$ Tod is one Wey.

144
12

156 Tods in one Laſt.
2 Tods is one Stone.

312 Stone in one Laſt.
2 Cloves is one Stone.

624 Cloves is one Laſt.
7 Pounds is one Clove.

4368 Pounds in one Laſt.

laſt. wey. tod. ſtone. clo. pound.

In 24 08 4 1 1 6 how many Pounds?

12

$\frac{1}{2}$ 296
6 $\frac{1}{3}$

1780
148

1928
2

3857
2

7715
7

54011

Pounds.

In $\frac{1}{7}$ | 54011 how many Laſts, &c.

2 | 7715 6

2 | 3857 1

6 $\frac{1}{3}$ | 1928 1

12 | 296 4

Anſw. 24 8 4 1 1 6 as before

Of WINE MEASURE.

In a Ton of Wine, how many Quarts?

4 Hogſheads is one Ton.
63 Gallons is one Hogſhead.

252 Gallons.
4 Quarts is one Gallon.

1008 Quarts in one Ton.

Hhds. gall. quarts.
In 42 *Tons* 3 26 3 how many Quarts?

4

171
63

519
1028

10799
4

43199 *Quarts.*

In 43199 Quarts how many Tons, &c.

63 | 10799 3 Quarts.

4 | 171 26 Gallons.

Tons 42 3 26 3 as before.

Of LONG MEASURE.

In one Mile, How many Barly-Corns, when 3 Barly-Corns makes one Inch.

8 Furlongs is one Mile.
40 Poles is one Furlong.

320 Poles.
5½ Yards is one Pole.

1600
160

1760 Yards in one Mile.
3 Feet is one Yard.

5280 Feet in one Mile.
12 Inches is one Foot.

63360 Inches in one Mile.
3 Barly-Corns is one Inch.

190080 Barly-Corns in one Mile.

Geography the vaſt Compaſs of the World ſtiles, Twenty-one Thouſand and ſix Hundred Miles.

I demand how many Barly-Corns will reach round the ſame?

21600 Miles round the Earth and Sea.
190080 Barly-Corns in one Mile.

1728000
19440000
21600

I multiplied this by the Barly-Corns in one Mile, and it gave the Operation at once.

Anſ. 4105728000 Barly-Corns, that are ſaid to reach round the World.

Of

Of LAND MEASURE.

In one Square Mile, how many Square Quarters of an Inch.

In one Square Mile are - - - - 640 Acres.
4 Roods is one Acre.

2560 Square Roods.
40 Poles long, and 1 broad is.

¼ | 102400 Square Poles.
30¼ Yards is 1 Pole.

3072000
25600

3097600 Yards Square in.
9 Square Feet 1 Yard.

27878400 Square Feet.
144 Square Inches 1 Foot.

111513600
111513600
27878400

4014489600 Square Inches in a Mile.
16 Square Quarters 1 Inch.

24086937600
4014489600

Answer 64231833600 Square Quarters of an Inch in one Mile.

Of

Of TIME.

In one Solar Year, how many Minutes?

Months. W. D. Hours.

13 0 1 6 is one Solar Year.
4 Weeks is one Month.

52 Weeks.
7 Days is one Week.

365 Days is one Solar Year.
24 Hours is one Day.

1466
730

8766 Hours in one Solar Year.
60 Minutes in one Hour.

525960 Minutes in one Solar Year.

But, *Note*, That the Time from which the Sun leaveth one Tropick, to the Time it returns to the same Tropick, is 365 Days, 5 Hours, 49 Minutes, 4 Seconds and 21 Thirds.

I desire to know how many Minutes it is since the Birth of our Saviour JESUS CHRIST, it being accounted 1751 Years.

525960 Minutes in one Year.

525960
2629800
3681720
525960

Answer 920955960 Minutes since the Birth of our Saviour.

I multiplied the lower Number by the higher, to save Trouble and Figures.

Contractions in Reduction.

l.

In 240 how many Sixpences? 240 *l.*

In one Pound are 40 Sixpences

Answer 9600

In 9600 Sixpences, how many Pounds?

4|0 | 960|0

L. 240 Answer.

In 326 *l.* how many Groats?

326 *l.*

In 1 *l.* are 60 Groats.

Answer 19560

In 19560 Groats, how many Pounds?

6|0 | 1956|0

Answer 326 *l.*

In 336 *l.* how many Marks?

336 *l.*

3

2|1008

Anſ. 504

I multiply by 3 and Divide by 2. becauſe a Mark is 2 thirds of a Pound.

In 426 *l.* how many Nobles?

426 *l.*

3 Nobles is 1 *l.*

Anſ. 1278 Nobles.

In 872 Ninepences how many Thirteen-pence Half-pennies?

872 Ninepences.

2

3 | 1744

Anſ. 581 $\frac{1}{3}$ Thirteen-Pence Half-Pennies.

I Multiplied by 2, and Divided by 3, becauſe Two 13 d. $\frac{1}{2}$ are equal to Three 9 Pences.

CONTRACTIONS *in* REDUCTION.

In 328 Nobles, how many Crowns?

4

3 | 1312

Anſ. 437 $\frac{1}{3}$ = 1 *s.* 8 *d.* which is $\frac{1}{3}$ of a Crown.

In 437 $\frac{1}{3}$ Crowns, how many Nobles?

3

4 | 1312

Anſw. 328 Nobles.

In 12 | 876 Guineas, at 1 *l.* 1 *s.* 8 *d.* ℔, how many Pounds?

73

Anſwer 949 *l.* *Note*, 1 *s.* 8 *d.* is $\frac{1}{12}$ of a Pound.

In 12 | 949 *l.* how many Guineas, at 1 *l.* 1 *s.* 8 *d.* ℔ ſubtract.

73

Anſwer 876 Guineas.

Note, 13 Pound is equal to 12 Guineas, at 1 *l.* 1 *s.* 8 *d.* ℔.

In 248 Moidores, at 1 *l.* 7 *s.* 0 *d.* ℔, how many Double Joannis's, at 3 *l.* 12 *s.* ℔.

248
3 } 3 Double Joannis's is equal to 8 Moidores.
8 | 744

Anſwer 93 Joannis's.

TARE

TARE *and* TRET.

THESE are Allowances commonly uſed among Merchants, in ſuch Commodities as are ſold by Weight.

TARE is the Weight of the Box, Cheſt, Hogſhead, *&c.* wherein the Goods are carried or put.

TRET is an Allowance of four Pounds in 104 *lb.* for Goods, wherein is Loſs, as Treacle, Sugar, and ſuch like.

CLOFF is an Allowance of 2 Pound upon every Draught, which exceedeth 300 Groſs Weight.

SUBTILE is the Weight of the Goods when the *Tare* is ſubtracted, but not the *Tret*.

NEAT Weight is the Remainder, when both (if both be allow'd) are taken away.

Tare allowed among Merchants in *Lancaſhire* in ſelling Cotton-Wool, is only one Pound *p.* Score, moſt commonly.

A RULE in VERSE.

From *Groſs* ſubtract the *Tare*,
Remainder *Subtile* are;
From *Subtile* take the *Tret*,
And the Remainder's *Neat*.

When *Tare* is an Aliquot Part of 112, take ſuch Part of the *Groſs* Weight, which ſubtracted from the *Groſs*, leaves the *Neat* Weight.

Any ALIQUOT PART is ſhewn in the annexed

TABLE.

lb.		
For $3\frac{1}{2}$	take $\frac{1}{32}$	of the Given Number.
For 7	take $\frac{1}{16}$	of the Given Number.
For $10\frac{1}{2}$	take $\frac{1}{16}$ and $\frac{1}{32}$	of that which Sum ſubtract from Given Numb.
For 14	take $\frac{1}{8}$	of the Given Number.
For 21	take $\frac{1}{8}$ and $\frac{1}{32}$	of that which Sum ſubtract from Given Numb.
For 28	take $\frac{1}{4}$	of the Given Number.
For 56	take $\frac{1}{2}$	of the Given Number.
For 84	take $\frac{3}{4}$	of the Given Number.

For 1 ℔ Score, take $\frac{1}{20}$ of the Given Number, which is the Allowance amongſt Merchants, commonly for Cotton-Wool.

In 4 Bags of Cotton, marked with the Groſs Weight, as followeth, (Tare 14 *lb.* ℔ Bag) what Neat Weight, and what does the Neat Weight come to, at 1 *s.* 2 *d.* ℔ Pound?

		C.	*qrs.*	*lb.*		
Bags, N°	1 =	7	2	14		*lb.*
	2 =	6	1	07	Groſs	Tare 14 ℔
	3 =	7	3	09		4 Bags.
	4 =	4	0	26		
					Whole Tare	56 *lb.*
Whole Groſs		26	0	00		
Subt. Tare			2	00		
		25	2	00	Neat.	

25

25

25.56 *lb.* odd Weight.

for 2*d.* take $\frac{1}{8}$ | 2856 Neat Pounds, at 1 *s.* 2 *d.* ℔.

Add them 476

2 | 0 | 333 | 2

Anſw. 166 *l.* 12 *s.*

Or thus.

C. q. lb.

25 2 00 Neat.

4

102

28

816

204

If 1 *lb.* : 14 *d.* : : 2856 *lb.* coſt.

14

11424

2856

12 | 39984

2 | 0 | 333 | 2

L. 166 12 0 as before.

In

C. q. lb. lb.

In 326 3 12 Groſs (Tare 10½ ℔ Hundred) how many Hundred, Neat; and what does the Neat Weight come to at 7 *l.* ℔ Hundred Weight, and what will one Pound coſt at that Rate?

	C. q. lb.
For 7 *lb.* take $\frac{1}{16}$ Part	$\frac{1}{16}$ | 326 3 12 Groſs.
For 3½ *lb.* take ½ of this,	½ | 20 1 20 } add.
	10 0 24 }
Subtract this from the given N°	30 2 16 Tare.
	296 0 24 Neat.

L. lb. lb.

If 112 : 7 : 1 give ?

20

112 | 140 | 1*s.* 3*d.* ℔ Pound.

112

28

12

112 | 336 | 3*d.*

336

0

7 Pound ℔ Hund.

2072 *s.* *d.*

1 10 0 for 24 *lb.*

L. 2073 10 0 Anſwer.

lb. s. d. lb.

If 1 : : 1 3 : : 24 coſt?

6 & 4

7 6

4

L. 1 10 0 add this to the 2072 *l.* and it gives the Anſwer.

In

C. q. lb.

In 242 3 16 of Sugar Groſs, (Tare 14 *lb.* ℔ Hundred) what Neat Weight; and what does the Neat Weight come to at 1 *l.* 17 *s.* 4 *d.* ℔ Hundred, and what is one Pound of this Sugar worth?

For 14 *lb.* Tare ℔ *C.* take

	C.	*q.*	*lb.*	
½	242	3	16	Groſs.
	30	1	12½	Tare.
	212	2	03½	Neat.

l.	*s.*	*d.*
1	17	4
20		
37		
12		

If 112 *lb.* 448 : 1 *lb.* coſt?

1

112 | 448 | 4 *d.* ℔ Pound.

448

00

lb.	*d.*	*C.*	*q.*	*lb.*
If 1	: 4	:: 212	2	3½

212

212

212.59½ *lb.* odd Weight.

4 *d.* is ⅓ | ⅓ | 23803½

2|0 | 793|4 6

L. 396 14 6

When I divided by ⅓ for 4 *d.* there remain'd one, which is ⅓ of one Shilling, equal 4 *d.* and for the ½ Pound I added 2 *d.* to it, and it makes 6 Pence, as by the Work.

In

In 24 Bags of Raiſins, each *C. q. lb.* 1 2 7 Groſs, (Tare 12 *lb.* ℔ Bag) what Neat Weight, and what do they come to, at 6 *d.* ℔ Pound?

	C.	*q.*	*lb.*
	1	2	7
			4 & 6
24 Bags.	6	1	0
12 *lb.* ℔ Bag.			6
288 Tare.	37	2	0
	37		
	37		
	37.56 odd Weight.		
	4200 Groſs.		
	288 Tare.		
4|0|391|2	3912 Neat.		
L. 97 $\frac{3}{40}$ = 16 *s.*			
Anſwer 97 *l.* 16 *s.* 00 *d.*			

In a Hogſhead of Treacle, containing *C. q. lb.* 20 2 14 Groſs, (Tare 39 *lb.*) what does the Neat Weight come to, at 1 *d.* $\frac{1}{2}$ ℔ Pound?

	C.	*q.*	*lb.*	
	20	2	14	Groſs.
	20			
	20			
	20.70 Odd Weight.			
	2310 Groſs Pounds.			
	39 Tare.			
For 1 *d.* $\frac{1}{2}$ take $\frac{1}{6}$	$\frac{1}{6}$|2271			
2|0|28|3 $\frac{7}{6}$ = 10 *d.* $\frac{1}{2}$				
L. 14 3 10 $\frac{1}{2}$ Anſwer.				

C. q. lb. *lb.*

In 1372 3 14 Groſs of Tobacco, (Tare 21 ℔ Hundred, Tret 4 *lb.* ℔ 104 *lb.* and 2 *lb.* for Cloff upon every 336 *lb.* Suttle,) what does the Neat Weight coſt, at 13 *d.* ½ ℔ Pound?

	C.	q.	lb.	
⅛ |	1372	3	14	Groſs.
½ |	171	2	12	4 } add.
	85	3	6	2 }
	257	1	18	6 Tare.
336 |	1115	1	23	10
	42	3	17	Tret.
	1072	2	06	Suttle.
	6	1	15	Cloff.
	1066	0	19	Neat.

1066
1066
1066.19 *lb.* odd Weight.

lb.	*lb.*	C.	q.	lb.	
If 336	2	1072	2	6	
		1072			
		1072			
		1072.62 *lb.* odd wt.			
		120126			
		2			
		112	*C. q. lb.*		
336)240252)715(6:1:15					
		2352	672		
		505	43		
		336	28 : 1		
		1692	15		
		1680			
Inconſiderate		12			

For 1 *d.* ½ take ⅛ ⅛ \| 119411
14926⅛ = 4 *d.* ½.

2\|0 \| 13433\|7 : 4 *d.* ½.

L. 6716 17 4½ Anſwer.

C. q. lb. *lb.*

In 326 3 12 Groſs of Sugar, (Tare 12 ℔ Hundred) what Neat Weight, and what does it come to, at 5 *d.* ½ ℔ Pound?

C. q. lb.

326 3 12 Groſs.

4

1307

28

10458

2615

lb. lb.

If 112 12 :: 36608 *lb.* Groſs give.

12

112 | 439296 | 3922 Tare.

336

1032

1008

249

224

256

224

32

36608 Groſs.

3922 Tare.

32686 Neat.

For { 4 *d.* take ⅓ 10895 ⅓ = 4 *d.*
{ 1 ½ take ⅛ 4085 ⅝ = 9 *d.*

2 | 0 | 1498 | 1 1

L. 749 1 1 Anſwer.

In

In 6 Bags of Cotton, marked with the Groſs Weight as followeth,

	C.	*q.*	*lb.*
A	2	3	12
B	3	0	16
C	2	3	09
D	2	1	19
E	2	0	17
F	2	2	11

Tare 1 *lb.* ℔ Score, what does the Neat Weight come to, at 6 *l.* 6 *s.* ℔ Hundred, and what is it ℔ Pound?

20 | 16 0 00 Groſs.
3 08 Tare.
15 0 20 Neat.

Note, When Tare is 1 *lb.* for every 20 *lb.* Groſs take 1 20th of the Given Number, and ſubtract that (being the Tare) from the Groſs, and it leaves the Neat.

Mult. 6 *l.*

90

5 *s.* is $\frac{1}{4}$ $3\frac{1}{4}$ = 15 *s.*
1 $\frac{1}{3}$ of it 0 15
20 *lb.* is 1 02 6 *d.*

Anſ. *l.* 95 12 6 *The Price of all the Neat Weight.*

lb. *s.* *lb.*
If 112 126 20
20
2520 *l.* *s.* *d.*
112 | 2520 | 22 | 1 2 6
224 2
280 2
224
56
12
112 | 672 | 6 *d.*
672
0

lb. *s.* *lb.*
If 112 126 1
1

112 | 126 | 1 Shilling.
112
14
12
112 | 168 | 1 *d.* Anſ. 1 *s.* 1 *d.* $\frac{1}{1}$ ℔ Pound.
112
56 = $\frac{1}{2}$
112

In 9 Bags of Cotton-Wool, each Groſs, (Tare 1 *lb.* for every Twenty Pounds Groſs) What neat Weight, and what does the neat Weight come to, at 1 *s.* 3 *d.* ½ ℔ Pound?

	C.	*q.*	*lb.*
Groſs	3	2	06
N° of Bags			9
20 | 31	3	26	Groſs.
Tare	1	2	11 ½⅒ Incon.
	30	1	15 Neat.
	4		
	121		
	28		
	973		
	243		
	3403		Neat Pounds.

s.	*d.*
1	3 ½
12	
15	
4	
62	Farthings.

lb.	*far.*	*lb.*
If 1	62	3403
		62
		6806
		20418
		4 | 210986
		12 | 52746 ½
		20 | 4391 5 6
		L. 219 15 6½

Note, There's nothing allowed Merchants for what's above even Scores.

In

In 4 Hogſheads of Raiſins, containing C. q. lb. 39 1 14 Groſs, (Tare 40 *lb.* ℔ Hogſhead, and 4 *lb.* ℔ 104 *lb.* for Tret out of the Suttle, and 2 *lb.* ℔ 336 *lb.* for Cloff out of the laſt Suttle,) What will the Neat Weight coſt, at 5 *d.* ½ ℔ Pound? 23 *l.* 2 *s.* 2 *d.* ½ being deducted for Cuſtom and other Charges.

C.	q.	lb.
39	1	14
4		
157		
28		
1260		
315		
Groſs 4410		
Tare 160		
Suttle 4250		
Tret 163		
Suttle 4087		
Cloff 24		
Neat 4063		

lb.	
40	℔ Hogſhead.
4	Hogſheads.
160 *lb.*	Tare.

lb.	lb.	lb.	
If 104	4	4250	
		4	
104	17000	163	Tret.
	104		
	660		
	624		
	360		
	312		
Incon.	48		

lb.	lb.	lb.	
If 336	2	4087	
		2	Cl.
336	8174	24	
	672		
	1454		
	1344		
Incon.	110		

lb.	d.	lb.	
If 1	5 ½	4063	
For 4 *d.* take ⅓		1354⅓ = 4 *d.*	
For 1 ½ take ⅛		507⅞ = 10 *d.* ½	
2	0	186	2 2 ½
		93	2 2 ½ Coſt.
Cuſtom		23	2 2 ½ being deducted.
L.		70	0 0 Anſwer.

FACTORSHIP.

FACTORSHIP.

FACTORSHIP is that Rule by which Merchants and their Factors divide their Gain or Loſs, according as the Factor's Perſon is eſteemed.

A few Queſtions will make it plain.

A Merchant delivers to his Factor 60 *l.* and if the Factor put in 45 *l.* he will allow him Half of the Gains; What's the Factor's Perſon eſteemed at?

Subtract 45 *l.* from 60 *l.* reſteth 15 *l.* and ſo much the Factor's Perſon's eſteemed at. The Reaſon is evident.

A Merchant delivers to his Factor 80 *l.* and allows him for his Gains, one Third of the Gain; What Money muſt the Factor put in that he may have an equal Share of the Gains?

From 80 *l.* take $\frac{1}{3}$, which is 26 *l.* 13 *s.* 4 *d.* which ſubtract from 80 *l.* leaves 53 *l.* 6 *s.* 8 *d.* which the Factor muſt put in to have Half the Gains.

The Work.

	l.	*s.*	*d.*
3 |	80	00	0
The Factor's Perſon eſteemed at	26	13	4
The Factor muſt put in *L.*	53	06	8

to have equal Gains.

A Merchant delivers to his Factor 600 *l.* and esteemed his Person at 250 *l.* when they made up their Accounts they found they had gained 40 *l.* *p*^{r} *Cent.* What's the Factor's Part?

To 600 *l.* add 250 *l.* the Sum is 850 *l.* Then say,

l.	*l.*	*l.*	
If 100	40	850	gain.
	40		
Whole Gains,	34.000		

	l.		
Answer	340	Then say,	
l.	*l.*	*l.*	
If 850	340	250	gain.

250

17000
680

L.

Answer 100 the Factor's Part, and the Merchant must have 240 *l.* for his Share of the Gains.

850 | 85000 | 100 *l.*
850

00

A Merchant delivers to his Factor 960 *l.* and if the Factor put in 475 *l.* 18 *s.* 6 *d.* he would allow him Half of the Gains, What's the Factor's Person esteemed at?

	l.	*s.*	*d.*
From	960	00	00
Take	475	18	06
The Factor's Person is esteemed at - -	484	01	06

A Factor receives 1100 *l.* from a Merchant, to which he adds 400 *l.* of his own, his Perſon is eſteemed at 250 *l.* What muſt the Factor have of the Gain?

It's plain, the Merchant's Stock is 1100 *l.* and the Factor's own Stock 400 *l.* together with 250 *l.* his perſonal Value, makes 650 *l.* which is the Factor's Stock.

	l.
The Merchant's Stock,	1100
The Factor's Stock, - -	650
	1750

Then ſay, If 1750 1 650 Anſwer $\frac{13}{35}$, the Factor muſt have for his Share: Then conſequently, the Merchant muſt have $\frac{21}{35}$ for his Share of the Gains.

ARITHMETICAL PROGRESSION.

THE Rules of PROGRESSION conſiſteth of two Parts: The firſt, called as above, ARITHMETICAL PROGRESSION, and ſecond called GEOMETRICAL PROGRESSION, which I ſhall ſpeak of hereafter in its proper Place.

ARITHMETICAL PROGRESSION is when a Rank of Numbers, above Two, increaſe or decreaſe equally, by the continued Addition or Subtraction of ſome equal Number.

So, 0. 4. 8. 12. 16. 20. and 36. 30. 24. 18. 12. 6. are two Ranks of Numbers in *Arithmetical Progreſſion*; the firſt, increaſing by the Addition of

of 4 continually, and the ſecond decreaſing by the continual Subtraction of 6, and ſo of any other.

In *Arithmetical Progreſſion* you muſt truly obſerve the five Things following;

1. The firſt Term, commonly the leaſt.
2. The laſt Term, commonly the greateſt.
3. The Number of Terms.
4. The equal Difference, or common Exceſs.
5. The Sum of all the Terms, or Total aggregate.

Any Three of theſe Five being given, the other Two may be found.

But take the following Theorems firſt.

1. Any Term of an *Arithmetick Progreſſion* contains the firſt (that is the leaſt) Term, together with the Product of the common Exceſs, and Number of Terms before it.

So in this *Arithmetical Progreſſion*, 0. 4. 8. 12. 16. 20, the Term 20 is equal to the ſecond Term 4, multiplied by itſelf, and the Exceſs added thereto, as 4 Times 4 is 16; to which add the common Exceſs, the Sum is 20.

And in this *Progreſſion*, 1. 5. 9. 13. 17. 21. this Rule may ariſe, that if the common Exceſs be multiplied by the Number of Terms made leſs by One, and to the Product the leaſt Term be added, the Sum is equal to the greateſt; and this Rule holds good to the former *Progreſſion*: Thus, 4 Times 5 is 20, for the firſt: And for the latter, thus, 4 Times 5 is 20; and the leaſt Term 1, makes 21 equal to the laſt Term.

2. If three Numbers be in *Arithmetical Progreſſion*, the Double of the Mean is equal to the Sum of the Extreams.

So, 5. 10. 15, are three Numbers in *Arithme-*

tical Progreſſion; and the Double of the Mean, *viz.* 10 equals 20, is alſo equal to the Sum of the two Extreams, *viz.* 5 and 15 added together is alſo equal to 20, and ſo of this following.

Thus, 2. 6. 10. are three Numbers in *Arithmetical Progreſſion*; the Double of Mean equals 12; the Sum of the Extreams equals 12 alſo.

3. Suppoſe four Numbers in *Arithmetical Progreſſion*, the Sum of the two Means is equal to the Sum of the two Extreams.

Suppoſe 3. 7. 11. 15. are four Numbers in *Arithmetical Progreſſion*, the Sum of the two Means, 7 and 11, equals 18; and ſo the Sum of the Two Extreams, 3 and 15, equals 18 alſo.

4. Any Term doubled in an *Arithmetical Progreſſion* is equal to the Sum of any other two Terms of an equal Diſtance.

Admit, 2. 7. 12. 17. (22.) 27. 32. 37. 42 were the *Arithmetical Progreſſion* given, the Double of 22 is equal to the Sum of 2 and 42, or of 7 and 37, or of 12 and 32, and of 17 and 27, all Numbers which are equally diſtant, and whoſe Sum is always 44.

5. The Sum of any two Terms in any *Arithmetical Progreſſion* is equal to the Sum of any other two Terms of the like Diſtance from them.

Admit, 1. 7. 13. 19 25. 31. 37. 43. were the Progreſſion given, the Sum of 1 and 43 is equal to the Sum of 7 and 37, and of 13 and 31, and of 19 and 25, all being alike diſtant, and equal always to 44.

6. 1. Whatever your *Arithmetical Progreſſion* be, if the Sum of the greateſt and leaſt Terms be multiplied by the Number of Terms, and the Product

Product divided by 2, the Quotient is equal to the Sum of all the Terms.

2. Or if the Sum of the greateſt and leaſt Terms be multiplied by ½ the Number of Terms, the Product is equal to the Sum of all the Terms.

3. Or if the Half Sum of the greateſt and leaſt Terms be multiplied by the Number of Terms, the Product is the Sum of all the Terms.

4. Or if the Middle Number (if the Progreſſion be odd) be multiplied by the Number of Terms, gives the Sum of all the Terms.

If 2. 4. 6. 8. 10. 12. 14. were an *Arithmetical Progreſſion* given to find the Sum.

The firſt Rule. 14 × 2 = 16 × 7 = 112 | 2 = Sum 56

The ſecond Rule. 14 × 2 = 16 × 3½ = 48 + 8 = Sum 56

The Third Rule. 14 × 2 = 16 | 2 = 8 × 7 = Sum 56

The 4th R. 8 × 7 = Sum 56

I recommend the laſt Rule, as being the leaſt ſubject to Miſtakes.

7. If the Progreſſion be Natural Number, as 1. 2. 3. 4, 5. 6. 7. 8. 9, &c. If the laſt Term be multiplied by the next Greater, one Half of the Product is equal to the Sum of the whole Progreſſion.

Or if the laſt Term be multiplied by the Half Sum of the next Greater, the Product is the Sum of the whole Progreſſion.

Let the Sum of 1. 2. 3. 4. 5. 6. 7. 8. 9. be required.

The first Rule.

9 Greatest.
10 Next greater.

2 | 90

45 Sum

The second Rule.

9 } Greatest.
5 } ½ of the next Greater.

45 Sum as before.

How many Times does a Clock strike in going one Time round, or in 12 Hours?

12 Greatest.
13 Next Greater.

½ | 156

78 Sum.

12
6 ½

72
6

Sum 78 as before.

Or thus, the last Progression may be found, or any such other.

12 Greatest Term.
1 Least Term, add them together.

13
6 Half Number of Terms, multiply by it.
78 The Sum as before.

How many Times or Strokes does a Clock strike in one Year?

A Clock strikes 78 Times you see in 12 Hours.

2
156 Times in one Day.
365 Days in one Year.
780
936
468

A Clock strikes 56940 Times in one Year, if not Leap Year. To which add } 156 and it gives the Times or Strokes when it is Leap Year. }

A Clock strikes 57096 Times when it is Leap Year.

8. In

8. In a Progreſſion of Natural odd Numbers, as 1. 3. 5, &c. the Sum of the whole is equal to the Square of the Number of Terms.

Let 1. 3. 5. 7. 9. 11. 13. 15. 17. be the Numbers given.

The Number of Terms is 9, ſquared is 81, the Sum of the Whole; or ſquare the middle Number and you have the Sum.

9. In a Natural Progreſſion of even Numbers, the Sum of the Whole is equal to the Product of the Number of Terms, by one more than the Number of Terms given.

Let 2. 4. 6. 8. 10. 12. 14. 16. were the Numbers given, What is the Sum of the Whole?

Here the Number of Terms is 8, which multiplied by One more than the Number of Terms, *viz.* 9, gives, 72 the whole Sum.

10. In whatever Progreſſion, if from the greateſt Term the leaſt be taken, the Remainder divided by the common Exceſs, and to the Quotient add One, you have the Number of Terms.

Let 2. 4. 6. 8. 10. be the Numbers given.

From 10
Subt. 2

2 | 8 | 4 to which add 1, make 5 equal the Number.

11. In any *Arithmetical Progreſſion* whatſoever, if from the laſt Term, the firſt be ſubtracted, and the Remainder divided by One leſs than the Number of Terms, the Quotient is the common Exceſs.

Let

Let 4. 9. 14. 19. 24. be the Numbers given.

From 24
Subt. 4

4 | 20 | 5 The Number of Terms, and the Common Exceſs; but it will not always be the Number of Terms, tho' in this it is; but it always be the Common Exceſs.

Now I return to where I left off, *viz.* In having any Three of the Five given to find the other Two.

PROP. I.

The Firſt or leaſt Term, the leaſt or greateſt Term, and the Number of Terms being given to find the common Exceſs.

Or, the Firſt, Second, and Third, given to find the Fourth.

Rule, From the Second ſubtract the Firſt, the Remainder divided by the Third, made leſs by one, gives the Fourth?

By the firſt Theorem and the Rule.

A Man had Ten Children, the Youngeſt was 4 Years old, and the Oldeſt was 40? what was the common Difference of their Ages; they increaſing in an *Arithmetical Progreſſion*.

The Second, 40
The Firſt, 4

The 3d. ſub. -- 1 --- equal 9 | 36 | 4
36
0

Anſwer, they Increaſed by 4 Years,

Or thus, 4. 8. 12. 16. 20. 24. 28. 32. 36. 40.
1. 2. 3. 4. 5. 6. 7. 8. 9. 10.

A

A Man had 16 Children, the Youngeſt was 3 Years old, and the Oldeſt was 48, the Increaſing in *Arithmetical Progreſſion*; what was the common Difference of their Ages?

The 2d	48		
The 1ſt	3		
The 3d.—ſubt. 1.—equal	15 | 45 |	3	Common Difference.
	45		
	0		

PROP. II.

The Firſt, Second, and Third, given to find the Fifth

RULE.

Multiply the half Sum of the Firſt, and Second by the Third, the Product is the Fifth; by the 6th Theorem, and 3d. Way.

A Man buys 24 Yards of *Devonſhire* Plain in *Arithmetical Progreſſion*; for the firſt Yard, he paid two Shillings, and for the Laſt, he paid twelve Shillings? what did the Whole amount to.

The firſt Term	is	2
The laſt Term	is	12
The half of		14
	is	7
The Number of Terms		24
		2|0|16|8 Shillings.
		L. 8 8 0 Anſwer.

PROP.

PROP. III.

The First, Second, and Fourth given to find out the Third RULE.

From the Second ſubtract the Firſt, the Remainder divide by the Fourth, and to the Quotient add One, gives the Third.

By the firſt Theorem, and the firſt Rule following.

A Chapman ſent his Servant a Journey, with Orders to Travel 4 Miles the firſt Day, and his laſt Day's Travel was 48 Miles, he increaſed his Journey every Day 4 Miles; how many Days did he Travel?

The Laſt 48
The Firſt 4 ſubt.

The Fourth 4 | 44 | 11 To which add 1, makes 12.
0 The Number of Days he Traveled.

PROP. IV.

The Second, Third, and Fourth, given to find the Firſt.

Rule, Multiply the Fourth by the Third, made leſs by one, the Product Subtracted from the Second, leaves the Firſt.

A Man in 4 Days went from *Blackburn* to *London*; every Day's Journey was greater than the Day before by 4 Miles; his laſt Day's Journey was 48 Miles; What was the firſt?

The Fourth is 4
The firſt is 4, from which ſubt. 1. is 3 Mul.
The Product 12 which ſubtract from the Second, 48, leaves 36 the firſt Day's Journey.

PROP.

PROP. V.

The First, Third, and Fourth given, to find out the Fifth RULE.

From the Product of the Third into the Fourth ſubtract the Fourth, and to the Remainder add the Double of the First; Half the Product of that Sum, multiplied by the Third, gives the Fifth.

Take the old following Quere, which I ſhall anſwer two Ways.

An Hundred Eggs are placed in a right Line, a Yard diſtant from one another, and the firſt a Yard diſtant from a Baſket: It is required to know how far one may go, before another Man can bring the Eggs one by one into the Baſket, without breaking any?

The Third	100	
The Fourth	2	Mul.
	200	
The Fourth	2	Subt.
	198	Remains.
The Double of the Firſt	4	Add.
	202	
By the Third	100	Mul.
½	20200	
Yards	10100	Anſwer.

This is Mr. *Hill*'s Way of anſwering the above; but for me, this Way I will chooſe.

To add the firſt and laſt Terms together, and multiply the Product by the Number of Terms, and the Product is the Anſwer.

The first Term 1 } Add.
The last Term 100 }
101 Product.
The Number of Terms 100 Mul.
Answer 10100 Yards.

½ | 1760 | 10100 | 5 ½, and 420.
880 | 8800
1300
Subt. 880
Yards 420

Answer, 5 ½ Miles, and 420 Yards, one may go while the said Eggs are in gathering.

PROP. VI.

The Second, Third, and Fifth given, to find the First.

RULE.

Divide the Fifth by the Third, and from the Quotient subtract half the Product of the Fourth into the Third made less by One, the Remainder is the First.

A Man being married to a Woman, with 260 Pounds to her Portion, who was to receive the same at 10 several Payments, each Payment to exceed the former by 4 Pounds; he is willing to bestow the first Payment on any One that can tell him what the First Payment must be. *Quere*, What must the Arithmetician have for his Pains?

Divide 3*d*. : 10 | 260 Fifth.
26 Quotient.
18 Subtract.
L. 8 Ans.

The 3d made less by one 9
The Fourth 4
½ | 36
18

Answer, 8 Pounds for the Workman's Wages.

Thus, 1. 2. 3. 4. 5. 6. 7. 8. 9. 10.
Payments, 8. 12. 16. 20. 24. 28. 32. 36. 40. 44.

To

To find the Sum of the Payment, as before is taught. The laſt Term 44.

The firſt Term 8 Add.

Sum 52

Multiply by the ½ Number 5

His Wife's Portion is, *L.* 260 as before.

GEOMETRICAL PROGRESSION.

GEOMETRICAL PROGRESSION is when a Rank of Numbers above two, increaſe or decreaſe by an equal Ratio; that is, by the continual Multiplication or Diviſion of ſome equal Numbers.

So, 2. 4. 8. 16. 32. 64, and 1215. 405. 135. 45. 15. 5. are two Ranks of Numbers in *Geometrical Progreſſion*; the firſt of them aſcending by a Double Ratio of two, continually multiplying; and the Latter decreaſing, by continually dividing the preceding Term by 3, or in a Triple Ratio.

In any *Geometrical Progreſſion* the ſame Things are to be conſidered as in *Arithmetical Progreſſion*.

1. The firſt Term, commonly the leaſt.
2. The laſt Term, commonly the greateſt.
3. The Number of Terms.
4. The Ratio, or common Exceſs. And
5. The Total Sum of all the Terms.

But before I ſhall enter either on Theoremes or Propoſitions, I ſhall calculate a Table for *Geometrical Progreſſion*, proceeding from Unity, and continued to 145 Places, the Ratio or common Exceſs being 2; by which Table I ſhall anſwer the Queries I ſhall propound in this Rule, which will be very quickly done by the Help of the Table.

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The TABLE.

1	1	26	33554432
2	2	27	67108864
3	4	28	134217728
4	8	29	268435456
5	16	30	536879912
6	32	31	1073741824
7	64	32	2147483648
8	128	33	4294967296
9	256	34	8589934592
10	512	35	17179869184
11	1024	36	34359738368
12	2048	37	68719476736
13	4096	38	137438953472
14	8192	39	274877906944
15	16384	40	549755813888
16	32768	41	1099511627776
17	65536	42	2199023255552
18	131072	43	4398046511104
19	262144	44	8796093022208
20	524288	45	17592186044416
21	1048576	46	35184372088832
22	2097152	47	70368744177664
23	4194304	48	140737488355328
24	8388608	49	281474976710656
25	16777216	50	562949953421312

51	1125899906842624
52	2251799813685248
53	4503599627370496
54	9007199254740992
55	18014398509481984
56	36028797018963968
57	72057594037927936
58	144115188075855872
59	288230376151711744
60	576460752303423488
61	1152921504606846976
62	2305843009213693952
63	4611686018427387904
64	9223372036854775808
65	18446744073709551616
66	36893488147419103232
67	73786976294838206464
68	147573952589676412928
69	295147905179352825856
70	590295810358705651712
71	1180591620717411303424
72	2361183241434822606848
73	4722366482869645213696
74	9444732965739290427392
75	18889465931478580854784
76	37778931862957161709568

77	75555863725914323419136
78	151115727451828646838272
79	302231454903657293676544
80	604462909807314587353088
81	1208925819614629174706176
82	2417851639229258349412352
83	4835703278458516698824704
84	9671406556917033397649408
85	19342813113834067952988816
86	38685626227668133590597632
87	77371252455336267181195264
88	154742504910672534362390528
89	309485009821345068724781056
90	618970019642690137449562112
91	1237940039285380274899124224
92	2475880078570760549798248448
93	4951760157141521099596496896
94	9903520314283042199192993792
95	19807040628566084398385987584
96	39614081257132168796771975168
97	79228162514264337593543950336
98	158456325028528675187087900672
99	316912650057057350374175801344
100	633825300114114700748351602688
101	1267650600228229401496703205376
102	2535301200456458802993406410752
103	5070602400912917605986812821504
104	10141204801825835211973625643008
105	20282409603651670423947251286016

106	405648192073033408478945025120322
107	811296384146066816957890051240644
108	1622592768292133623915780102881288
109	3245185536584267267831560205762576
110	6490371073168584535663120411525152
111	12980742146337069071326240822305024
112	25961484292674138142652481646100048
113	51922968585348276285304963292200096
114	103845937170696552570600992658440192
115	207691874341393105141219853168880384
116	415383748682786210282439706337607768
117	830767497365572420564879412675215536
118	1661534994731144841129758825350430072
119	3323069989462289682259517650700861144
120	6646139978924579364519035301401722288
121	13292279957849158729038070602802445776
122	26584559915698317458076141205606891552
123	53169119831396634916152282411213783104
124	106338239663279326983230456482242756608
125	212676479325586539664609129644855132216
126	425352958651173079329218259289710264432
127	850705917302346158658436518579420528864
128	1701411834604692317316873037158841057728
129	3402823669209384634633746074317682114456
130	6805647338418769269267492148635364229912
131	13611294676837538538534984297270728458224
132	27222589353675077077069968594541456016448
133	54445178707350154154139937189082913832896
134	108890357414700308308279874378165827665792
135	217780714829400616616559748756331655331584
136	435561429658801233233119497512663310663168
137	871122859317602466462389950253266213273536
138	1742245718635204932932477990050653242654272
139	3484491437270409865864955980101306485308944
140	6968982874540819721729911960202612970617888
141	13937965749081639463459823920405225941233776
142	27875931498163278926019647840810451882475552
143	55751862996326557853839295681620903764951104
144	111503725992653115707678591363241807529902208
145	223007451985306231415357182726483615059804416

Before I enter upon the Propoſitions, or any Queries, I ſhall mention ſome Theorems, which will be very uſeful.

THEOREMS.

1. If three Numbers be in *Geometrical Progreſſion*, the Squate of the Mean or Middle Number is equal to the Product of the two Extreams, or outſide Numbers.

Let 2. 4. 8. be the three Numbers in *Geometrical Progreſſion* given.

Thus, 4 Times 4 is 16, and
2 Times 8 is 16, and ſo of any other.

2. If four Numbers be in *Geometrical Progreſſion*, the Product of the two Means is equal to the Rectangle or Product of the two Extreams.

Let 2. 4. 8. 16. be the four Numbers given.

Thus, 2 Times 16 is 32, the Extreams.
4 Times 8 is 32, the Means.

3. If any Term of *Geometrical Progreſſion* be ſquared, it will be equal to the Product of any two Terms of like Diſtance from that Term, either Way.

Let 2. 4. (8.) 16. 32. be the Terms given.

Thus, the Middle Term ſquared is 64, and 2 Times 32 is 64; and 4 Times 16 is 64; and ſo of any other.

4 In any *Geometrical Progreſſion* whatſoever, the Product of the two Extreams is equal to the Product of any other two immediate Terms of like Diſtance from both.

Let 4. 16. 64. 256. 1024. 4096. be the Progreſſion given.

The Product of 4 and 4096 is equal to the Product of 16 and 1024, and to the Product of 64 and 256, Try at your Pleaſure.

5. Any

5. Any Geometrical Progreſſion may be continued *ad Infinitum* upwards, and aſcending by Multiplication, and downwards or deſcending by Diviſion, the Ratio or common Exceſs being given, that being your Multiplicator upward, and your Diviſor downwards; notwithſtanding, oftentimes the Terms will not continue Integral Numbers, neither in the aſcending or deſcending Part thereof.

Let 8. 12. 18. 27. be the Numbers given, to be continued upward and downward by the Ratio of $1\frac{1}{2}$.

Demonſtration.

$\frac{3}{9}$. $\frac{12}{8}$. 8. 12. 18. 27. $\frac{81}{2}$. $\frac{243}{4}$, &c.

6. In any Geometrical Progreſſion where the Ratio is Multiple, *i. e.* where the greater Term is exactly meaſured by the leſs, may be continued upwards, *ad Infinitum*, in Integral Numbers; but downwards ſometimes, not ſo far as Unity.

Let 1. 2. 4. 8. 16, and ſo on, *ad Infinitum*, may be continued.

And let $\frac{1}{4}$. 3. 6. 12. 24. this Way, *ad Infinitum*, but will not deſcend to Unity, if the ſame were the Number given.

7. In any *Geometrical Progreſſion*, if the Ratio be not Multiple, the ſame can neither be continued upward, *ad Infinitum*, in Integral Numbers, nor downwards, ſo far as Unity.

Let 36 and 48 be the Progreſſion given, where the Ratio is $\frac{4}{3}$, both aſcending and deſcending.

Demonſtrated thus:

$\frac{3}{4}$. 27. 36. 48. 64. $\frac{256}{81}$.

So you ſee 27 and 64 cannot be divided by $\frac{4}{3}$, ſo Integral Numbers ceaſe, and ſtill cannot be brought downwards to Unity.

8. In any *Geometrical Progreſſion*, if the Extreams be prime Numbers one to another, the ſame Progreſſion can be continued no farther either upwards or downwards in Integral Numbers; ſo in the laſt, ſuppoſing 27 and 64 to be the Extream Terms, and they being prime one to another, therefore they can be continued no farther either Way in Integral.

Note, Prime Numbers are thoſe when only Unity is their common Meaſure.

9. In any *Geometrical Progreſſion* proceeding from Unity, the ſecond Term, (the firſt Term not being computed) the 4th, 6th, and 8th Term, and all the following Terms, whoſe Exponents may be divided by 2, are ſquare Numbers: The 3d, 6th, 9th, and all the following Terms, whoſe Exponents may be divided by 3, are Cube Numbers; the 6th, 12th, 18th, and the following Terms whoſe Exponents may be divided by 6, are both Square and Cube Numbers: The 5th, 7th, 11th, 13th, and all the following Terms, whoſe Exponents are prime Numbers, are neither Square nor Cube Numbers.

Note, Exponents are a Series of natural Numbers proceeding from Unity, ſhewing the Places of the Terms of the Progreſſion.

Numbers are ſaid to be Prime, which Unity only meaſureth.

As 0. 1. 2. 3. 4. 5. 6. 7. 8.
1. 2. 4. 8. 16. 32. 64. 128. 256. &c.

Note, That in this and ſome following Theorems, whether proceeding from Unity or not, we have

have annexed their Indices or Exponents, placing a Cypher over the firſt Term of the Progreſſion, whereby it may be ſeen how far any Term is diſtant from Unity; or from the firſt Term, if not Unity.

10. In any *Geometrical Progreſſion* proceeding from Unity, if any Term be ſquared or multiplied by itſelf, it will produce any Term of the ſame Progreſſion, doubly diſtant from Unity.

So the laſt Progreſſion, the Square of 8 the 3d Term is equal to 64, which is the 6th Term, or doubly diſtant from Firſt or Unity.

11. In any Geometrical Progreſſion proceeding from Unity, the Rectangle of any two Terms is equal to that Term of the ſame Progreſſion, ſignified by the Sum of the others Exponents.

0. 1. 2. 3. 4. 5. 6. 7.

Let 1. 3. 9. 27. 81. 343. 729. 2187. be the Progreſſion given. The Product of the 3d and 4th equal to 2187, which is the 7th Term; and the Product of the 2d and 5th equal the ſame, becauſe the Sum of either of their Exponents makes Seven.

12. In any *Geometrical Progreſſion* not proceeding from Unity, if any Term be ſquared or multiplied by itſelf, and the Product divided by the firſt Term or leaſt Term, the Quotient gives a Term doubly diſtant from the firſt.

0. 1. 2. 3. 4. 5. 6. 7. 8. Expon.

Let 3. 6. 12. 24. 48. 96. 192. 384. 768. be the Progreſſion given.

The Square of the 4th Term 48 is 768, when the ſaid Square of 48 is divided by 3.

48
48
384
192
3 | 2304
768, which Number is the 8th Term, and doubly diſtant from the Firſt, or ſo of any other.

13. In any *Geometrical Progreſſion* not proceeding from Unity, if any two Terms be multiplied together, and the Product divided by the leaſt or firſt Term, the Quotient will be equal to that Term, ſignified by the Sum of the other Exponents.

Let 0. 1. 2. 3. 4. 5. 6. 7.
2. 6. 18. 54. 162. 486. 1458. 4374. be the Progreſſion given.

The Second Term 18 } Multiply by the
The Fifth Term 486 } higher Number.
3888
486
Divide by the 1ſt Term, 2 | 8748
4374 equal to the 7th Term, as was required.

Theſe Four laſt Theorems are uſeful in finding any following Term of a Geometrical Progreſſion, without producing all immediate Terms.

14. In any finite Geometrical Progreſſion, where the Ratio is double, the Difference of the greateſt and leaſt Term is equal to the Sum of all the Terms, except the greateſt.

Let

Let 2. 4. 8. 16. 32. be the Progreſſion given.
From the greateſt Term 32
Subtract 2 the leaſt, 2

Remains 30 and is equal to the Sum of all the reſt, except the greateſt.

15. In any finite Geometrical Progreſſion it holds: As the Ratio or common Exceſs made leſs by One, is to Unity or One, ſo is the Difference of the greateſt and leaſt Term, to the Sum of all, but the greateſt.

Let 2. 6. 18. 54. 162, be the Progreſſion given. As the Ratio, that is 3 here, made leſs by one, equal 2 is to 1, ſo is the Difference of 162 and 2, the greateſt and leaſt Terms, to 80 the Sum of all, but the greateſt.

Hence it follows, that if the Ratio of any Geometrical Progreſſion be double the Difference of the greateſt and leaſt Term, is equal to all the reſt, if the Ratio be triple the Exceſs or Difference is double the Sum of all the reſt; if quadruple, triple; if quintuple, quadruble, and ſo on.

Obſerve the Ratio was Triple in the laſt Progreſſion.

16. In any Finite Geometrical Progreſſion it holds,
As the Difference of the greateſt Terms,
Is to the greateſt,
So is the greateſt made leſs by the leaſt,
To the Total Sum of all, excepting the leaſt.

Let 2. 4. 8. 16. 32. be the Progreſſion given.
As 16 the Difference of the two greateſt Terms
Is to 32 the greateſt Term,
So is 32 the greateſt Term, made leſs by the leaſt

leaſt 2, leaves 60, and is the Sum of all the reſt but the leaſt. Or thus in Figures.

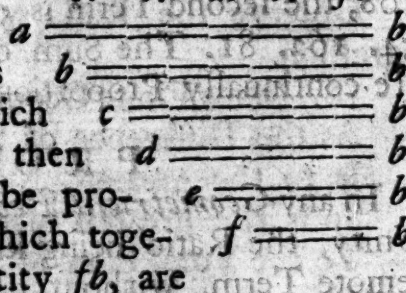
As 16. 32. 30, 60. and ſo of any other.

17. In any Geometrical Progreſſion whatſoever, decreaſing and continued, *ad Infinitum*, it holds.

As the common Difference made leſs by One
Is to Unity,
So is the firſt or greateſt Term.
To the Sum of all the following Terms, *in Infinitum*.

Let 162. 54. 18. 6. 2. $\frac{2}{3}$. $\frac{2}{9}$. $\frac{2}{27}$. $\frac{2}{81}$. $\frac{2}{243}$, &c. be the Progreſſion given, decreaſing by a Triple Ratio, as may be ſeen.

Then, as 2 (*viz.* the Ratio *Minus* Unity) is to Unity or 1, ſo is 162, the greateſt or firſt Term to 81, which is the Sum of all the remaining Terms, *ad Infinitum*: This is evident by the 15 Theorem; wherefore, in any *Geometrical Progreſſion* deſcending in any given Proportion, *ad Infinitum*, the leaſt Term vaniſheth, and therefore it holds as in this Theorem.



Let there be ſeveral continued Proportionals, as *a. b. bb. cb.* &c. all which transfer into the firſt *ab*; then will *ab. bc. cd.* &c. be proportional Differences, which together with the laſt Quantity *fb*, are equal to the firſt *ab*; becauſe if that Proportional Number be continued downward, *ad Infinitum*, the laſt Quantity, as ſaid before, vaniſheth; therefore the Infinite Proportion Differences are equal to the whole Line *ab*; further, becauſe it holds, that

that as *a b* is to *b b*, ſo is *b b* to *c b*, &c. And by Diviſion, as *a b* is to *b b*, ſo *b c* to *c b*. And by Converſion, as *a b* the firſt Difference, to *b b* the firſt Quantity, ſo is *b c* the ſecond Difference to *b b* the ſecond Quantity, and ſo on: Therefore, as *a b* the firſt Difference to *a b* the firſt Quantity, ſo is the Differences to the whole Sum of all the Infinite Quantities.

Alſo, it is evident, that the firſt Term of an Infinite deſcending *Geometrical Progreſſion*, where the Ratio is Double, is equal to the Sum of all the reſt, *ad Infinitum*.

But if the Ratio be Triple, the firſt Term is Double the Sum of all the reſt, in a Quadruple Progreſſion Triple, in a Quintuple one Quadruple, and ſo on. Hence we may demonſtrate Unity not to be the Beginning of Numbers.

18. In any *Geometrical Progreſſion* continued downward, *ad Infinitum*, it will be; As the Difference of the two firſt or greateſt Terms is to the ſecond Term, ſo is the firſt or greateſt Term to the Sum of all the reſt, *ad Infinitum*: So in the laſt Progreſſion the Difference of the two firſt Terms is 108, the ſecond Term is 54, the firſt 162; as 108. 54. 162. 81. The Sum of all the Infinite Terms are continually Proportionals.

PROP. I.

In any *Geometrical Progreſſion* proceeding from Unity, the Ratio being known, how to find any remote Term, without producing all the immediate Terms. RULE.

Find a few of the leading Terms, over which place their Exponents, then by Theorem 10, multiply the laſt found Term by itſelf, which will produce

produce a Term double thereto. And this laſt multiplied by itſelf produceth another Term doubly diſtant again: Thus do till you either have the Term ſought, or one that falls a little ſhort, if ſo, multiply the Term laſt found by that Term anſwering the Difference of the Exponent of the laſt found Term, and that ſought, this laſt Product is the Term required by Theorem Eleventh.

A Country Gentleman going to a Fair to buy Oxen, meets with a crafty Youth who had a Company of very good Oxen, in Number 23: The Gentleman demanding the Price, was anſwered, he ſhould have them for 16 Pounds an Ox one with another; The Gentleman bids him 15 Pounds a Piece, and take all: The young Spark tells him it would not be taken; but if, ſays he, you will give me what the laſt Ox will come to, by doubling the whole Number by a Farthing, you ſhall have all; to which the Gentleman aſſents, The Queſtion is, what the Gentleman muſt pay for the Oxen?

0. 1. 2. 3. 4. 5. Exponents
Thus, 1. 2. 4. 8. 16. 32. Terms.

The Term, *viz.* 32 multiplied by itſelf produces the 10th; and that multiplied by itſelf produces the 20th Term, and that by the Term under the Exponent 2, which is 4, gives 4194304 the laſt Term, and the Price of the Oxen in Farthings, which makes 4369 *l.* 1 *s.* 3 *d.* ¼. A great Rate for ſo many Oxen!

Note, You muſt always make the laſt Term leſs by one, when the Ratio is double, and then you will be right.

PROP. II.

In any *Geometrical Progreſſion* not proceeding from Unity, the Ratio being known, and the firſt Term

Term to find any remote Term without producing all the intermediate Terms.

RULE.

Find a few of the leading Terms as in the Laſt, and multiply the Laſt by itſelf, and divide the Product by the firſt or leading Term, the Quotient gives a Term doubly diſtant from the firſt by the 12th Theorem; and this again multiplyed by itſelf and divided by the firſt Term, gives a Term doubly diſtant from the laſt Theorem. Thus do until either you have the Term ſought, or one that falls a little ſhort; if ſo, multiply the laſt Term found by that Term anſwering to the Difference of their Exponents, and this Product divided by the firſt or leading Term gives the Term required by Theorem 13.

A Gentleman dying left Ten Sons, to whom and to his Executor he left his Eſtate in Manner and Form following; Friſt, to his Executor, in ſeeing his Will performed, he left 1024 Crowns; the Youngeſt was to have as many and half as many as the Executor; and ſo every Son to exceed the next Younger by the equal Ratio of 1 ½. The Queſtion is, What was the oldeſt Son's Portion?

Executor.	Youngeſt.	Next.	Next.	Next.	Next.
1024 :	1536 :	2304 :	3456 :	5184 :	7776
0	1	2	3	4	5

Then multiplying the 5th Term by itſelf, produces 60466176; and this divided by 1024 gives the 10th Term, or the oldeſt Son's Portion.

Here the Ratio being half Triple, the Difference of the Greateſt and Leaſt is half double the Sum of all the Reſt, except the Greateſt, by Theorem 15.

If the whole Eſtate had been required, it might have been found by Theorem 15, to have amounted to 175099 Crowns.

PROP. III.

First Number, Common Exceſs, and Number of Places given, to find the Total Value or Sum of all the Places.

RULE.

Find the laſt Term as in the Laſt, then from the greateſt Term ſubtract the Leaſt, the Remainder divided by the Common Exceſs, made leſs by one, gives the Sum of all, except the Greateſt; to which add the Greateſt, gives the Sum of the Whole; or, the Difference of the greateſt and leaſt Terms divided by the Exceſs, made leſs by one, the Quotient multiplied by the Exceſs, and to the Product add the firſt Number, the Sum is equal to the Whole.

What will a Horſe coſt by doubling the Nails in his Shoes, which are 32, with a Farthing?

Take the Number out of the Table againſt 33, and make it leſs by one, and that's the Value in Farthings.

Over againſt 33, is 4294967296
made leſs by 1

is equal to 4 | 4294967295 Farthings.
12 | 1073741823 3/4
2|0|8947848|5 : 3
L. 4473924 : 5 : 3 3/4

A great Price for one Horſe!

A Gentleman having a Coat and Waiſtcoat with 12 Dozen of Silver Plate Buttons: A Corn-Man ſeeing it, and fancying it, demands of the Gentleman the Price thereof? Who anſwered, if he would double every Button with a Barley Corn, proceeding from the firſt gradually to the laſt, it ſhould be his: To which the Baker aſſents.

I demand the Number of Barley Corns, together with the Worth and Weight of the ſame?

Obſerve, that 12 Dozen is 144, which look for 145 in the Table, made leſs by One, is the following.

Millions repeated.

7	6	5	4	3	2	1
22.300	745.198	530.623	141.535	718.272	648.361	505.980.415

Barley Corns.

Which ſaid Value, at 2 *s.* ℔ Buſhel comes to

6	5	4	3	2	1 *Mill. repeated.*
L. 4.093	383.011	477.720	840.957	363.853	276.130.966

[11 *s.* 11 *d.* ½. Value.

Now for the Weight: *Note*, 681 Grains of Barley are ſaid to be one Ounce. The Weight of one Buſhel, ſuppoſed 50 *lb.*

6	5	4	3	2	1 *Mill. repeated*
20.466	915.057	288.604	204.786	819.266	380.654.832.594

Pounds, 13 Ounces, 3 Drams ½. All which may ſeem impoſſible to any but an Accomptant, who are the beſt Judges in theſe Matters.

What will 20 Pieces of Cambrick come to, by doubling every Piece by a Farthing; and ſuppoſing every Piece contain 50 Yards, and each Yard worth 1 *l.* 1 *s.* 8 *d.* what will the Difference be in the Price?

Make the 21ſt Number leſs by One equal to 1048575 Farthings.

4 | 1048575

12 | 262143 $\frac{3}{4}$

20 | 21845 3

L. 1092 5 3 $\frac{3}{4}$

Number of Pieces 20
Number of Yards 50

1092 5 3 $\frac{3}{4}$
1083 6 8 For { 1000 *L.*, 50 One Shilling., 33 6 8 Eight-pence Line.

Diff. *l.* 8 18 7 $\frac{3}{4}$ { 1083 6 8

So you ſee the Difference is 8 *l.* 18 *s.* 7 *d.* $\frac{3}{4}$, and by ſo much it is better to ſell them by doubling every Piece with a Farthing, than to ſell it Yard by Yard at 1 *l.* 1 *s.* 8 *d.* ℔.

A certain Man's Daughter being married on New-Year's-Day, gave her Huſband towards her Portion One Shilling, promiſing to double it on the firſt Day of every Month for one whole Year; I demand what her Portion would be?

Make the 13 Number in the Table one leſs, and it will be 4095. the Number of Shillings which was her Portion.

20 | 409 | 5

Or, *L.* 204 15 00 was her Portion.

A cunning Youth agreed with a Maſter (unſkill'd in Numbers) to ſerve him eleven Years, without any other Reward for his Service but the Produce of a Wheat Corn for the firſt Year; And that Product to be Sowed the ſecond Year, and ſo on, from Year to Year, until the End of the Time; allowing the Encreaſe to be but in a ten-fold Proportion. I demand the Sum of the whole Produce, and what it will come to at 3 Shillings the Buſhel?

First, { 1 . 2 . 3 . 4 . 5 Exponents or Years.
10 . 100 . 1000 . 10000 . 100000

100000

1000000000 the 9th Term.
100

Laſt Year's Produce 100000000000 the 11th Term.
10 Ratio ſubtract.

Ratio made leſs by one 9 | 999999999990
Now 7680 Wheat Corns will fill 7680 | 11111111111110 the Produce.
a Statute Pint which is the Diviſor

64 | 14467592 Pints, and 64
Pints are contained in one Buſhel

226056 ¼ Buſhels
at 3 Shillings ℔ Buſhel 3

2 | 0 | 67816 | 8 ¼

For eleven Year's Service, *L.* 33908 : 8 : 4¼ wages

Many more Queſtions may be added, but theſe are ſufficient.

The

The GOLDEN RULE.

THE *Golden Rule*, is ſo called, from its extraordinary Uſefulneſs, not only in Arithmetical Queſtions, but in all Parts of the Mathematicks.

It is alſo called the *Rule of Three*, becauſe there is always three Numbers given to find out a Fourth, and it is properly called the *Rule of Proportion*, becauſe the firſt Number bears ſuch Proportion to the Second, as the Third does to the Fourth.

The Deſign of this Rule is to ſhew how to find a fourth proportional Number, by having 3 Numbers given, which are deducible from the 16 Prop. of the ſixth Book of *Euclid's Elements of Geometry*.

The RULE *is*,

Multiply the ſecond and third Numbers together, and divide the Product by the firſt Number, and the Quotient thence ariſing is the fourth Number ſought; Or,

Divide the Second by the Firſt, and multiply the Third by the Quotient, and the Product is the Number required; For the Fourth Number contains the Third, ſo often as the Second contains the Firſt; and this is called *Direct Proportion*.

Or according to this VERSE.

The Queſtion Firſt and Third are of the ſame,
The middle Number has another Name,
And which to make the Fourth you cannot miſs,
The unknown Quantity it always is.

Obſerve this, whether the Queſtion be direct or indirect, and it will anſwer.

If the Fourth the Second muſt exceed, then ſee
By the great Extream it multiplyed be,
But if it muſt be leſs then Second aim
To multiply it by the leſs Extream.

If

If 1 Yard of Cloth coſt 4 *s.* 6 *d.* what will 96 Yards coſt at the Rate?

12

Pence 54

Yd. D. Yds.
If 1 54 96 give?
54
384
480

12 | 5184
2 | 0 | 43 | 2
Anſ. *L.* 21 12

l. s.
If 96 Yds of Cloth coſt 21 12
what will 1 Yard coſt?
20
432

Yds. Shill.
If 96 432 1 Yard give?
1
96 | 432 | 4 *s.* 6 *d.* Anſwer.
384
48

Proof 12
96 | 576 | 6 Pence.
576

If 1 Yard of Wrapping coſt 4 Pence, what will 100 Yards coſt?

Yd. D. Yds.
If 1 4 100 give?
4

12 | 400
2 | 0 | 3 | 3 4
Anſw. *L.* 1 13 4

If 100 Pound of Butter coſt 1 *l.* 13 *s.* 4 *d.* what will 1 Pound coſt?

1 *l.* 13 *s.* 4 *d.*
20
33
12

100 | 400 | 4 Pence.
400

Proof of the former; tho' it changed from Wrapping to Butter, which exchanging the Word, I ſhall do often.

If

If 32 Rundlets of Brandy coſt 96 Pounds, what will 4 Rundlets coſt?

R. L. R.

If 32 96 4 give? Or thus, 32 | 96 | 3

4 96

32 | 384 | 12 Pounds. ..

32 4

64 3

64 Both Ways. Anſw. 12 Pounds

If 4 Rundlets of Rum coſt 12 Pounds, what will 32 Rundlets coſt?

R. L. R.

If 4 12 32 *Or thus,*

12 4 | 12 | 3 Mul.

4 | 384 | 96 Pounds. ..

36

Both Ways, and 24 32

Proof of the former 24 3 Mul.

. Anſwer 96 Pounds.

If 8 Pounds of Pepper coſt 14 Shillings, what will one Hundred Weight, or 112 Pounds coſt?

lb. s. lb. *lb.*

If 8 14 112 If 112 of Tobacco coſt 9*l.* 16*s.*

14 what will 8*lb.* coſt? 20

448 *lb. s. lb.* 196

112 If 112 196 8

8 | 1568 8

2 | 0 | 19 | 6 112 | 1568 | 14 Shill.

Anſ. *L.* 9 16 112

448

Proof, 448

..

What

C. qr. lb.

What will the Carriage of 14 2 14 come to at the Rate of 8 Shillings ℔ Hundred?

lb. s. C. qr. lb.

If 112 8 14 2 14 give.

4
58
28
468
117
1638

8 *Shill.* 2*d. Number.*

2|0 *l. s.*

112 | 13104 | 11|7 (5 17 The Answer.

112 10
190 17
112
784
784

C. qr. lb. *l. s.*

If 14 2 14 of fine Sand cost 5 17 what will 112 *lb.* cost?

20
117 *Sh.*

C. qr. lb.

14 2 14
4
58
28
468
117
1638

lb. s. lb.

If 1638 117 112 give?

112
1404
117

1638 | 13104 | 8 *s.* Answer and

13104 Proof.

A Grocer bought of a Merchant *C. qr. lb.* 4 2 16 Weight of Sugar, at the Rate of 3 *d.* $\frac{1}{4}$ *℔* Pound, and ſold it again for 9 *l.* 13 *s.* 4 *d.* Whether did he gain or looſe by the Bargain, and how much?

3 *d.* $\frac{1}{4}$
4
13 Farthings.

lb. far. lb.
If 1 13 520
13
1560
520
4 | 6760
12 | 1690
2|0 | 14|0 10

Anſwer, *L.* 7 0 10 coſt

C. qr. lb.
4 2 16
4
18
28
150
37
520

	l	*s.*	*d.*
Sold it for	9	13	4
Coſt him	7	00	10
Gained *L.*	2	12	6

A Chapman bought of a Tradeſman 8 Packs of Cheques, each Pack contained 32 Pieces, and each Piece was 20 Yards, and gave after the Rate of 1 *s.* 2 *d.* *℔* Yard, and ſold them again for 282 *l.* 12 *s.* 6 *d.* Whether did he gain or looſe, and how much by this Bargain?

8 Packs.
22 Pieces is one Pack.
256 Pieces.
20 Yards *per* Piece.

Yd. d.
It 1 14 5120 Yards give.
14
20480
5120
71680 Pence.

12 | 71680
210 | 597 | 3 4 *d.*
298 13 4 Coſt.
282 12 6 Sold at.
Anſ. *L.* 15 00 10 Loſt by this Bargain.

If

If 1 Piece of Cambrick coſt *l.* *s.* *d.* 4 15 6 what will 7 Packs, each 45 Pieces coſt?

		20
	7	95
	315	12
Pie.	*D. Piec.*	1146 Pence.

If 1 1146 315 give.

	315
	5730
	1146
	3438
12	360990
2|0	3008|2 6
Anſ. *l.*	1504 2 6

If 7 Packs of Callamanco's, each 45 Pieces coſt 1504 *l.* 2 *s.* 6 *d.* what will 1 Piece coſt?

7 Packs.	1504 *l.* 2 *s.* 6 *d.*	
45 Pieces.		20
315 Pieces.		30082
		12
		360990 Pence.

If 1 Gallon of Ale coſt 1 *s.* 4 *d.* what will 46 Gallons coſt?

	G.	*D.*	*Gal.*
If	1	16	46 give.
			16
			276
			46
		12	736
	2|0	6|1	4 *d.*
Anſw.	*L.*	3	1 4

Pieces.	*D.*	*Pi.*	
If	315	360990	1 give.
		1	
			12
	315	360990	1146
		315	210|95 6 *d.*
		459	*L.* 4 15 6
		315	
		1449	
Proof.		1260	
		1890	
		1890	

If a Load of Malt be ſold for 1 *l.* 4 *s.* 6 *d.* and out of it be brewed 45 Gallons of Ale, at 1 *s.* 4 *d.* ℔ Gallon, and every Gallon pay 2 *d.* for Exciſe; what is there remaining for Profit to the Brewer?

G. s. d. Gall.
If 1 1 4 45
12 16
16 270
45
12|720
2|0|6|0

G. D. Gall. *s. d.*
If 1 2 45 pay 2
12|90|7 6
84
6

Sold for *L.* 3|0 0
Exciſe, 7 6 ſubt.
Sold for clear Money, *L.* 2 12 6
The Malt coſt 1 4 6
Anſwer *L.* 1 8 0 The Brewer's Wages, beſides the ſmall Beer and Grains.

If 1 Gallon of Beer be ſold for *s. d.* 1 2 what will 45 Gallons coſt?

G. D. Gall.
If 1 14 45
14
180
45
12|630
2|0 5|2 6
Anſwer, 2 12 6 as before, clear Money.

If

l.

If a Man Farm an Eſtate of 140 a Year, what does it lie him in one Day with another the Year round?

Day *D.* *Day*

If 365 33600 1 give

1

		12	*s.*	*d.*			
365	33600	92	7	8	$\frac{20}{365}$	Anſ.	2800
	3285	84					12
	750	8					33600
	730						
	20						

If a Gentleman have a Daily Income of 7*s.* 8*d.* $\frac{20}{365}$ what is his Yearly Income?

Day *s.* *d.* *Days.*

If 1 7 8 $\frac{20}{365}$ 365 Income be?

12

92

365

460

554

276

12	33600
2	0 280 0

Anſwer *L.* 140 as before.

If 6*l.* 4*s.* 11*d.* 1*f.* be paid for the Carriage of 17*C.* 3*q.* 11*lb.* what was paid for the Carriage of one Pound;

l.	*s.*	*d.*	*f.*
6	4	11	1
	20		
	124		
	12		
	1499		
	4		
	5997		

C.	*qr.*	*lb.*
17	3	11
	4	
	71	
	28	
	569	
	143	
	1999	

lb. *far.* *lb.*

If 1999 5997 1 give.

1

1999 | 5997 | 3 Farthings, Anſ.

5997

If a Load of Potatoes, *viz.* 240 Pounds Weight, coſt 3 *s.* 6 *d.* How many Pounds are there for one Penny?

s. *d.*
3 6
12
42 Pence.

d. *lb.* *d.*
If 42 240 1 give?
1

42 | 240 | 5 Pound.
210

30
16

42 | 480 | 11 Ounces.
42

60
42

18
16

108
18

42 | 288 | 6 Drams.
252

36
4

42 | 144 | 3 Qrs. of a Dram.
126

18

Anſwer, 5 Pounds, 11 Ounces, 6 Drams, 3 Quarters of a Dram, and $\frac{18}{42}$ remains; and ſo many are there for One Penny.

The

The Sun is said to perform one entire Revolution, or 360 Degrees in the Space of 365 Days, 5 Hours, 48 Minutes and 57 Seconds of Time, called a Tropical or Solar Year; How much doth it move in one Day?

Days H. M. Sec.
365 5 48 57
24

1465 Hours.
730

8765
60

525948 Min.
60

31556937 Sec.

360 Degrees.
Min. 60 one Degree.

21600 Min.
60

1296000 Sec.

1 Day: 24 Hours.
60

1440 Min.
60

86400 Sec.

Sec. Sec. Sec.
If 31556937 1296000 86400 give?
86400

518400000
7776000
10368000

60 *M. Sec. Th.*
31556937) 11197440000 (3548) 59 8 19
94670811 300

173035890 548
157784685 540

152512050 8
126227748

262843020 *M. Sec. Th.*
252455496 An. 59 8 19 $\frac{2366961}{3155693}$
10387524 In one Day.
60

31556937) 623251440 (19
31556937

307682070
284012422

23669637, &c.

If 30 Pound of Sugar cost 7 *s.* 6 *d.* what will 12 Frails cost, each weighing neat 2 *qrs.* 24 *lb.*

lb.	*D.*	*lb.*		*s.*	*d.*		*qrs.*	*lb.*
If 30	90	960		7	6		2	24
		90		12			28	
			12	90				
30	86400		2880				20	
	60						6	
	264		2	0	24	0	80	
	240						12	Frails.
	240		*L.*	12	0	0	960	
	240							
	00							

A. B. C. and *D*, have 200 *l.* left them in such Sort, that as oft as *A* has 5 *l.* *B* must have 10, *C* 15, and *D* 20; I desire to know what was each Man's Share of the Money left them?

	L.		*L.*			*L.*
4 Times	5	is	20	for *A*	*A*	5
	10		40	*B*	*B*	10
	15		60	*C*	*C*	15
	20		80	*D*	*D*	20
	L.		200 Proof.			50 | 200 | 4
						200
						0

Observe, 4 is a common Multiplier to them all.

A Merchant conſigns to his Factor at *Leghorn* 180 Pieces of Cheques, with Commiſſion for Sale, at 1 *l.* 10 *s.* 6 *d.* ℔ Piece, and to make Returns from thence, the one Half in Yellow Cotton, at 8 *d.* ℔ Pound, and the other Half in *Spaniſh* Wines, at 25 *l.* ℔ Tun; I demand to know how much of each Sort ought to be returned for his Cheques?

d.	*lb.*	*l.*	*s.*	*d.*
If 8	1	137	5	0
		20		
		2745		
		12		
8		32940		

lb. of Cott. 4117 $\frac{4}{8}$ = $\frac{1}{2}$ Anſ.

l.	*s.*	*d.*
1	10	06
		12 & 5 & 3
18	06	0
		5
91	10	0
		3
274	10	0 Whole.
137	05	0 Half.

l.	*Tun*	*l.*	*s.*	*d.*
If 25	1	137	5	0
20		20		
500	5|00	27|45		

Tun 5 : 245

4 Hogſheads.

5|00 | 9|80

Hogſh. 1 : 180

63

540

1080

5|00 | 113|40

Gall. 22 : 340

340

4

5|00 | 13|60

Quarts 2 : 360

2

5|00 | 7|20

Pint 1 : $\frac{1 \cdot 0}{5\,0\,0}$

Anſwer, 5 Tun, 1 Hundred, 22 Gall. 2 Quarts, 1 Pint $\frac{1\,0\,0}{5\,0\,0}$ of Wine.

What comes the Insurance of 556 *l.* 13 *s.* 4 *d.* to, at 3 *l.* 10 *s.* 6 *d.* ℔ Cent.

	l.	*l.*	*s.*	*d.*	*l.*	*s.*	*d.*
If	100	: 3	10	6	: 556	13	4

20 20 20

2000 70 11133

12 12 12

24000 846 133600

846

801600

534400

1068800

12

24|000 | 113025|600 | 4709

96

170 2|0 | 39|2 5

168 L. 19 12 5¼

225 [Answer.

216

9600

4

24|000 | 38|400 | 1

If 1 and a Half Pound of Butter coſt 4*d.* what will 2*lb* coſt?

half P. d. half Pound.

If 3 4 4 coſt?

4

3 | 16 | 5 *d.* ¼ ⅓

15

1

4

3|4|1

3

1

24

14400

Anſw. 5 *d.* ¼ and ⅓ of a Farthing.

If 13 Marks, with 14 Groats, buy 15 Load of Hay, How many Pounds, with 19 Crowns, for 90 Load will pay?

load *l.* *s.* *load.*

If 15 8 18 90

20

178

90

15 | 16020 | 106 | 8 | 53 8

250

15 10

102 6

90 6

120 . 8

120

l. *s.*

53 8

subt. 4 15 equal 19

Anſ. L. 48 13

13 Marks.

2

3 | 26

8 13 4

14 Groats, - 4 8

L. 8 18 0

Crowns.

Answer, 48 *l.* 13 *s.* with 19 Crowns, will buy 90 Load of Hay.

If that a Rule of three Feet long
Doth give five Feet in Shade,
And if a Steeple Ninety-nine,
How high in Feet is it made?

f. *f* *feet.*

If 5 : 3 : 99

3

5 | 297 | 59

25

47

45

2

Anſwer, 59 $\frac{2}{5}$ Feet high.

I demand what Principal in 12 Months will gain 84 *l.* 15 *s.* at 5 *l.* *℔ Cent.*

l. *l.* *l.* *s.*

If 5 come from 100 what does 84 15 come from?

20 20

100 1695

100

1|00|1695|00

L. 1695 The Anſwer.

N. B. At 5 *℔ Cent.* when the Intereſt is multiplied by 20, the Product is the Principal it came from in Pounds, as in this, and ſo of any other.

What Principal in 12 Months will gain 96 *l.* 17 *s.* Intereſt, at 5 *l.* *℔ Cent.* *℔ Annum.*

l. *l.* *l.* *s.*

If 5 100 96 17

20

L. 1937 The Principal and Anſwer required.

If 100 *l.* in 12 Months gain 5 *l.* Intereſt, what will the Intereſt of 540 *l.* be, for the ſame Time?

l. *l.* *l.*

If 100 5 540

5

L. 27|00 Anſwer 27 *l.*

C. qr. lb. *l. s. d.* *C. qr. lb.*

If 3 3 12 of Sugar cost 4 10 6 what will 11 2 8 cost?

4 20 4

15 90 46

28 12 28

122 1086 376

31 1296 92

432 6516 1296

9774

2172

1086

12

432 | 1407456 | 3258

1296 2|0| 27|1 6

1114 *L.* 13 11 6 Answer.

864

2505

2160

3456

3456

00

Or thus, when the Number of Hundreds, Quarters and Pounds are reduced, say,

lb. *l. s. d.* 432 Divide.

If 432 4 10 6 1296 | 3

Mul. 3 1296

0

L. 13 11 6 Answer as before.

Here you see I divided the third Number by the first, and multiplied the Second by the Quotient, and the Product is the Answer.

Contractions

Contractions in the Rule of Three.

THERE are two Rules belonging to the *Contractions* of the *Rule of Three*; the firſt I gave at the Beginning of the *Rule of Three*, and ſhall repeat it here again, *viz.*

1. Divide the Second by the Firſt, and multiply the Third by the Quotient, and the Product is the Anſwer.

2. Or, Divide the Third by the Firſt, and multiply the Second by the Quotient, and the Product is the Anſwer.

If 4 Yards of Cloth coſt 12 Shillings, what will 36 Yards coſt at that Price?

4 | 12 | 3 — 36 — 3

	l.	s.	d.
Shillings 108 =	5	8	0

Or, by the Second Rule,

4 | 36 | 9 — *s.* 12 — 9

L.	5	8	0

Or, by the Four Proportional Numbers, ſay,

As 4 12 : 36 108

36 — 4

432 — 432

If 4 Hundred of Sugar coſt 3 *l.* 16 *s.* 8 *d.* what will 48 Hundred coſt at that Rate?

By the firſt Rule,

	l.	*s.*	*d.*
4	3	16	8
		19	2 One Hundred.
		12	
		230	
		48	
		1840	
		920	
12		11040	
2	0	92	0
	L.	46	0 by the 1ſt Rule,

By the ſecond Rule,

4	48	12
	48	
	0	

l.	*s.*	*d.*
3	16	8
		12
L. 46	00	00 as before.

If 1 Yard of Cloth coſt 5 *s.* 6 *d.* what will 24 Yards coſt at the ſame Price?

s.	*d.*
5	6
	4 & 6
1	2 0
	6
L. 6	12 0

Or thus,

$\frac{1}{4}$	24
	6
0 $\frac{1}{4}$	12

L. 6 12 0 as before.

If 14 Cheque Pieces coſt *l.* 13 *s.* 6 *d.* 8 what will 112 coſt?

8

14 | 112 | 8 L. 106 13 4 Anſwer.

If 6 Groſs of Buttons coſt 18 *l.* what will 36 coſt?

6

6 | 36 | 6 L. 108 Anſwer.

If 36 Groſs coſt 108 *l.* what will 6 Groſs coſt?

6 | 108 | 18 *l.* Anſwer.

This is the ſame as if I ſaid, If 6 Groſs coſt 108 *l.* what will 1 Groſs coſt? Anſwer, 18 Pounds, as before.

If 3 Gallons of Rum coſt 15 *s.* what will 27 coſt?

9

3 | 27 | 9 L. 135 Anſwer.

Or thus, 3 | 15 | 5

27

5

L. 135 as before.

If

If 4 Load of Meal coſt *l.* 3 *s.* 8 *d.* 4 what will 56 Load coſt? 4 | 56 | 14

			2
	6	16	8
			7
L.	47	16	8 Anſwer.

Or thus,

l.	*s.*	*d.*	
4 | 3	8	4	
	17	1	
	12		
	205		
	56		
	1230		
	1025		
12 | 11480			
2 | 0 | 956			8
L. 47	16	8	as before.

If 3 Hogſheads of Sugar coſt 24 Pounds, what will 81 coſt? 81

8

3 | 24 | 8 *L.* 648 Anſwer.

Or thus,

3 | 81 | 27

24

108

54

L. 648 Anſwer as before.

Thus much for Contractions *in the* Rule *of* Three.

As 3 is to 24, ſo is 81 to 648

81	3
24	1944
192	
1944	

This is by the 4 Propoſitional Numbers.

The Double Rule of Three.

IN this Kind of Proportion there are Five Numbers given (and ſometimes more, which ſhall be ſhewed further hereafter in the Rule) to find out a Sixth, which Sixth will bear ſuch Proportion to the Product made of the fourth and fifth Numbers, as the third Number does to the Product made of the Firſt and Second.

The Rule for ſtating the Five given Numbers is this:

Make that the third Number from the Left-Hand, which is of the ſame Denomination with the Number ſought: Then place the two Numbers in the firſt and ſecond Place to the Left-Hand, which are Conjunctive in the Senſe of the Queſtion to the Third, and the other two Numbers in ſuch Order, that the Fourth may be of the ſame Denomination with the Firſt, and the Fifth of the ſame with Second; which done,

RULE.

Divide the Product of the Three Numbers next the Right, multiply one into another by the Product of the Two firſt to the Left-Hand, and the Quotient is the Sixth Number ſought.

If

If 100 *l.* Principal in 12 Months gain 5 *l.* Intereſt, what will 500 *l.* Principal gain in 8 Months?

L. p.	*M.*	*L. in.*	*L. p.*	*M.*
If 100	12	5	500	8

12 | 8

12|00 | 4000

5

l. s. d.

12|00 | 200|00 | 16 13 4

12

80

72

800 *l. s. d.*

20 Anſwer 16 13 4

12|00 | 160|00 | 13

12

40

36

400

12

12|00 | 48|00 | 4

48

00

If 500 *l.* in 8 Months gain 16 *l.* 13 *s.* 4 *d.* what will 100 *l.* gain in 12 Months?

20

500 | 333

8 | 12

4000 | 4000

100

400000

12

4|000 | 4800|0|00

12 | 1200

2|0 | 10|0

5: Anſwer and Proof.

If 100 *l.* Principal in 12 Months gain 5 *l.* Intereſt, what will 240 *l.* Principal gain in 6 Months?

L. *M.* *L.* *L.*
If 100 12 5 : 240 6 Months gain.

12 6
1200 1440
5
12|00|72|00|6 Pounds. Anſwer.
72 The reverſe is needleſs.
00

If 100 *l.* in 12 Months gain 5 *l* Intereſt, what will 100 *l.* gain in 6 Months? 100
5
500
100 6
12
1200 12|00|30|00|2 *l.* 10 *s.*
24 [for 6 Months.
600
20
12|00|120|00|10
12
000

If 100 *l.* in 12 Months gain 5 *l.* Intereſt, what will 1000 *l.* gain in 9 Months? 1000
5
5000
9
12|00|450|00|37 *l.* 10 *s.*
36
90
84
600
20
12|00|120|00|10 *s.*
12
000

If 35 Yards at *London* make 24 Yards at *Rome*, and 3 Yards at *Rome* make 5 Yards at *Paris*, and 100 Yards at *Paris* make 125 Yards at *Madrid*; How many Yards at *Madrid* make 42 Yards at *London*?

N. B. Here are ſeven Numbers given to find out an Eighth.

Rule. Multiply the Firſt, Third, and Fifth together for a Diviſor; and the Second, Fourth, Sixth, and Seventh together for a Dividend; and the Quotient is the Anſwer required.

	Yds.	*Y.*	*Y.*	*Y.*	*Y.*	*Y.*	*Y.*	
If	35	24	3	5	100	125	42	
	3					24		
	105.00					500		
I add 2 Cyphers to the Product, inſtead of multiplying by 100.						250		
						3000		
						42		
						6000		
						12000		
						126000		
						5		
					10500	630000		60 Yards.
						63000		
						0		

Anſwer. 60 Yards at *Madrid* makes 42 Yards at *London*.

If

If 2 Angels be equal to 20 Shillings, and 15 Shillings equal to 3 Crowns, and 60 Crowns equal to 15 Pounds, and 13 Pounds equal to 12 Guineas; How many Angels will countervail 650 Guineas?

Here are 9 Numbers given to find out a Tenth.

Rule. Multiply the Second, Fourth, Sixth and Eighth together for a Diviſor; and the Firſt, Third, Fifth, Seventh and Ninth together for a Dividend; and the Quotient is the Tenth Number and Anſwer required.

Ang.	*Sh.*	*Sh.*	*Cr.*	*Cr.*	*L.*	*L.*	*Gu.*	*Guineas.*
If 2	20	15	3	60	15	13	12	650

3
60
15
900
12
10800

2
1300
15
19500
60
1170000
13
15210000
1170000
108|00 | 1521|00|00 | 1408 Angels.
108
441
432
900
872
2800
20
108|00 | 560|00 | 5 Shillings.
540
2000
12
108|00 | 240|00 | 2 Pence.
216
2400

	Ang.	*s.*	*d.*
Anſwer.	1408	5	2

Admit,

Admit, the Garriſon of *Gibraltar* conſiſt of 11232 Soldiers, and they Drink out 1404 Gallons of Wine in 56 Days; How many Gallons will a Regiment of Soldiers, which conſiſt of 936 Men, drink in 168 Days?

Soldiers. Days. Gall. Sol. Days.

If 11232 56 1404 936 168

56

67392
56160

628992 Diviſor.

936

1008
504
1512

157248
1404

628992
628992
157248

628992 | 220776192 | 351
1886976

3207859
3144960

628992
628992

00

Anſwer. 351 Gallons.

If 14 Horſes in 16 Days eat up 56 Buſhels of Oats; How many Buſhels will 20 Horſes eat in 24 Days?

Horſes. Da. Buſh. Hor. Days.

If 14 16 56 20 24

16 24

224 480

56

2880

2400

224 | 26880 | 120 Buſhels, The Anſwer.

224

448

448

0

If 8 Cannons in 1 Day ſpend 48 Barrels of Gunpowder, how many Barrels will 24 Cannons ſpend in 12 Days?

C. D. B. Can. Days.

If 8 1 48 24 12

1 12

8 288

48

2304

1152

8 | 13824

Anſwer, 1728 Barrels.

If 20 Dogs for 30 Groats
Go 40 Weeks to Graſs,
How many Hounds for 60 Crowns
May Winter in that Place?

	Dogs.	*Cr.*	*Wks.*	*Cr.*	*Weeks,*	
If	20	2	40	60	12	*or Winter.*
	12			30		
Diviſor	24			1200		
				40		
				24 | 48000	| 2000 Dogs.	Anſwer.
				48		
				000		

This Queſtion is the ſame, as if 20 Dogs for 2 Crowns be kept 40 Weeks, how many Dogs will 60 Crowns keep the Remainder of the Year, or Winter-Quarter, which is 12 Weeks.

The Single Rule of Three Inverſe.

RECIPROCAL Proportion is when, of four Numbers, the Third (*viz.* That which moves the Queſtion) beareth the ſame Ratio to the Firſt, as the Second does to the Fourth.

Therefore, the leſs the third Term is, in reſpect to the Firſt; the greater will the fourth Term be, in reſpect to the Second.

If 16 Men can do a Piece of Work in 6 Days, How many Days will 8 Men require to do the ſame Work, at the ſame Rate of working?

Men. Days. Men.
If 16 6 8
6

8 | 96 | 12 Days.
8.

16
16 This is *Inverſe.*

0

If 8 Men do a Piece of Work in 12 Days, in how many Days will 16 Men do the ſame?

Men. Days. Men.
If 8 12 16
8

16 | 96 | 6 Days. The Anſwer.
96

0

Obſerve from the foregoing Queſtions, that 8 Men muſt needs require more Time than 16 Men, to do the ſame Work; conſequently, the greater the third Term is in reſpect to the Firſt, the leſſer will the fourth Term be in reſpect to the Second.

For when according to the true Meaning or Deſign of any Queſtion in Proportion, *More* require *More*, or *Leſs* require *Leſs*; the Terms are in Direct Proportion. But if More require Leſs, or Leſs require More, as above, then the Terms are in Reciprocal Proportion.

The

The Manner of placing down the propoſed Terms is the ſame in both Rules, *viz.* The firſt Term in the Suppoſition muſt be of the ſame Kind and Denomination with the third Term, which moves the Queſtion; and the Term ſought muſt be of the ſame Kind and Denomination with the ſecond Term in the Suppoſition; as in the two laſt Examples.

Thus in Example, $\left\{\begin{matrix}1\\2\end{matrix}\right.$ If $\begin{matrix}16 & 6 & 8\\ 8 & 12 & 16\end{matrix}\left\{\begin{matrix}12\\6\end{matrix}\right.\right\}$ Anſwer

The Queſtion being truly ſtated, obſerve the following RULE.

Multiply the firſt and ſecond Terms together, and Divide their Product by the third Term, the Quotient will be the Anſwer required.

Thus in the firſt Example,

16 Multiplied by 6, equal to 96; Divided by 8, equal to or produces 12, the Anſwer.

Thus the ſecond Example.

8 Multiplied by 12, equal to 96; Divided by 16 produces 6; the Anſwer as before in the ſecond Example.

That is, 16 Men can do the ſame Work in 6 Days, as 8 Men can do in 12 Days.

Now the Reaſon of theſe two Examples are grounded upon this Conſideration, *viz.*

If 8 Men require 12 Days to do the Work, conſequently one Man would require 8 Times 12 Days, or 96 Days to do the ſame Work: But if one Man can do it in 96 Days, moſt certain 16 Men can do it in One 16th Part of the Time, as is before demonſtrated to be true.

Admit, 1600 Soldiers were Beſieged in a Town, and their Victuals were computed to ſerve them 4 Months; How many of thoſe Soldiers muſt depart the Garriſon, that the ſame Victuals may ſerve the remaining Soldiers 16 Months?

Man. Sold. Months.

If 4 1600 16

4

16 | 6400 | 400 So many Soldiers muſt
64 ſtay in the Garriſon.

000

Conſequently, 400 Subtracted from 1600, leave 1200 Soldiers that muſt go out of the Garriſon; which is the Anſwer required.

A. borrowed of his Friend *B.* 450 *l.* for 8 Months, promiſing to do him the like Kindneſs upon Demand ſome Time after: *B* deſires *A* to lend him 680 *l.* The *Quere* is, how long *B* may keep the 680 *l.* to requite his former Kindneſs to *A*.

L. Mon. L.

If 450 8 680

8

Mon. W. D. Hours.

680 | 3600 | 5 1 1 5 $\frac{120}{168} = \frac{15}{21}$

3400

200

4

680 | 800 | 1 Week.

680

120

7

680 | 840 | 1 Day.

680

160

24

640

320

680 | 3840 | 5 Hours.

3400

440

If when Wheat is ſold for 6 *s.* 6 *d.* the Buſhel, the Penny White Loaf ought to weigh 8 Ounces, *Troy Weight*; What muſt it weigh when Wheat is ſold for 4 Shillings the Buſhel.

D. *Oun.* *D.* *s.* *d.* *d.* *s.* *d.*
If 78 8 48 6 6 is 78 : 4 is 48
8

48 | 624 | 13 Ounces, the Anſwer.
48
144
144
0

The Proof of this *Inverſe Rule* is eaſily deduced from its Operations, *viz.* The Product of the firſt and ſecond Terms, muſt be equal to the Product of the third and fourth Terms.

Note. Any Queſtion that falls under this Rule of *Inverſe Proportion*, may be ſtated as to have its Terms in *Direct Proportion*, by only changing the Places of the firſt and third Terms in the Queſtion, thus:

If a Field will feed 18 Horſes for 14 Weeks, how long will it feed 84 Horſes, at the ſame Rate of Feeding.

H. *W.* *H.*
If 18 14 84
18
112
14
84 | 252 | 3 Weeks.
252
0

Here the Terms are *inverſely*, as before.

Otherwiſe thus, If *H.* 84 *W.* 14 *H.* 18
14
72
This is direct Terms. 18
84 | 252 | 3
252
0

The

The Double Rule of Three Inverſe.

DOUBLE RECIPROCAL PROPORTION; The Rules are,

1. Multiply the Three laſt Terms together for a Dividend, and the Two firſt together for a Diviſor; the Quotient ariſing from them will be the Sixth Term, in *Direct Proportion.*

2. Multiply the firſt, ſecond, and laſt Terms together for a Dividend, and the other Two together for a Diviſor; the Quotient ariſing from them will be the Sixth Term in *Reciprocal Proportion.*

If 6 Buſhels of Oats will ſerve 4 Horſes 8 Days, How many Days will 21 Buſhels ſerve 16 Horſes?

If the Terms of this Queſtion be placed down, as before directed, they will ſtand thus.

	H.	*D.*	*B.*	*H.*	*Buſhels.*
If	4	8	6	16	21
				6	4
				96	84
					8
				96 | 672 | 7 Days.	
				672	The Anſwer
				0	required.

Obſerve the Numbers: The Firſt and Fourth are of one Name, the Third and Fifth of another, and the Second of the ſame Name with the Number ſought.

If

If 2 Men can do 12 Roods of Ditching in 6 Days; How many Roods of Ditching may be done by 8 Men in 24 Days, at the ſame Rate of Working?

	Men.	*Ro.*	*D.*	*M.*	*Days.*
If	2	12	6	8	24
	6				8
Diviſor	12				192
					12
				12	2304
					192 Anſwer.

If 8 Men deſerve 2 *l.* Wages for 5 Days Work, How much will 32 Men deſerve for 24 Days, at the ſame Rate?

Anſwer, 38 *l.* 8 *s.* 0 *d.*

Admit, 100 *l.* will defray the Expences of 5 Men for 22 Weeks and 6 Days; How long will 12 Men be ſpending of 150 *l.* at the ſame Rate?

Anſwer, 14 Weeks and 2 Days.

BARTER.

BARTER is a Rule amongſt Merchants, which in the Exchanging of one Commodity for another, informs them ſo to proportion their Goods, ſo as neither may ſuſtain Loſs.

Queſtions in *Barter* will not be difficult to them that underſtands the *Rule of Three*, it being altogether uſed in reſolving ſuch Queſtions.

Caſe 1. Merchants are ſaid to *Barter*, when each rateth his Goods ſold in *Barter*, as though they were ſold for ready Money.

RULE. Let one Merchant conſider what the Goods he is mindful to *Barter* amounteth to: Then by the Rule of *Proportion*, ſee how much of the other Merchant's Commodity the ſaid Amount will buy, and ſo much muſt be given.

Two Merchants, *A.* and *B.* Barter: *A.* hath 12 Cotton Cheque Pieces, at 1 *l.* 2 *s.* 6 *d.* ℔ Piece, which he is willing to Barter with *B.* at Yellow Cotton-Wool, at 10 *d.* ℔ Pound; How much Cotton-Wool muſt *B.* give *A.* for his Cotton-Cheque Pieces?

d.	*lb.*	*l.*	*s.*	*d.*
If 10	1	13	10	0

20

270

12

1|0 | 324|0

Anſwer, 324 Pound of Yellow Cotton-Wool *B.* muſt give *A.* for his Pieces.

l.	*s.*	*d.*	
1	2	6	*per.*

12

L. 13 10 0

lb.	*d.*	*lb.*
If 1	10	324

10

12 | 3240 Proof.

2|0 | 27|0

L. 13 10 0

Two

Two Merchants, *A.* and *B.* Barter; *A.* hath 3 *C.* 2 *qrs.* 14 *lb.* of Indico, at 3 *s.* 2 *d.* *℔* Pound; *B.* hath Pillow-Pieces, at 18 *s.* 6 *d.* *℔* Piece: I demand how many Pillow-Pieces must *B.* give *A.* for his Indico?

lb.	*d.*	*lb.*	*s.*	*d.*	*C.*	*qr.*	*lb.*
If 1	38	406	3	2	3	2	14
		38	12		4		
		3248	38 Pence.		14		
		1218			28		
		15428			116		
12 |					29		
20 |	128	5 8 *d.*			406		
L.	64	5 8 *A*'s Indico comes to.					

s.	*d.*	*Piece.*	*l.*	*s.*	*d.*
If 18	6	1	64	5	8
12			20		
222			1285		
			12		
222 |	15428 |	69 $\frac{1}{2}\frac{1}{2}\frac{0}{2}$ Pieces, *B.* must			
	1332	give *A.* for his Indico.			
	2108				
	1998				
	110				

Two Merchants, *A.* and *B.* Barter; *A.* hath 4 *C.* 3 *qrs.* 17 *lb.* of Sugar, at 4 *d.* $\frac{1}{2}$ *℔* Pound; *B.* hath Strong Beer, at 16 *d.* *℔* Gallon: How much Strong Beer muſt *B.* give *A.* for his Sugar?

B. Gall. l. s. d. — *C. qrs. lb.*

If 16 1 10 5 10 $\frac{1}{2}$ — 4 3 17

4 — 20 — 4

64 — 205 — 19

12 — 28

2470 — 159

4 — 39

64 | 9882 | 154 $\frac{26}{64}$ Gall.

64 — *for* 4 *d. take* $\frac{1}{8}$ | 549 *lb.* at 4$\frac{1}{2}$ *℔*

348 — *for* $\frac{1}{8}$ *take* $\frac{1}{8}$ *of it,* 183

320 — 22 $\frac{7}{8}$ 10 $\frac{1}{2}$

282 — 2 | 0 | 20 | 5 10 $\frac{1}{2}$

256 — *L.* 10 5 10 $\frac{1}{2}$

26 = 6 $\frac{1}{2}$

Anſwer. *B.* muſt give *A.* 154 Gallons, 3 Pints, and Half a Jill of Strong Beer, for his Sugar.

Two Merchants, *A.* and *B.* Barter; *A.* hath 4 *C.* 2 *qrs.* 10 *lb* of Tobacco, at 1 *s.* 2 *d.* *℔* Pound; *B.* hath Jean Pieces, at 11 *s.* 6 *d.* *℔* Piece: How many Jean Pieces muſt *B.* give *A.* for his Tobacco?

s. d. Pe. l. s. d. — *C. qrs. lb.*

If 11 6 1 29 19 8 Buy, — 4 2 10

12 — 20 — 4

138 — 599 — 18

12 — 28

7196 — 144

138 | 690 — 52 $\frac{20}{138}$ Pieces of Jeans. — 37

297 — $\frac{1}{6}$ | 514

276 — 85 8

20 — 2 | 0 | 59 | 9 8

L. 29 19 8

Caſe 2. When two Merchants Barter, and the One rateth his Goods above the common Price for ready Money, to know how the other Merchant may advance the Price of his Goods in Proportion to the firſt Merchant; and how to Barter without Loſs thereby.

RULE.—Conſider what the firſt Merchant's Goods are worth, ℔ Integer, in ready Money, and how much he advanceth the Price in Barter: Then ſay, If the Price of a Unit of the firſt Merchant's Commodity advance ſo much in Barter, (mentioning the Difference between his ready Money and Bartering Prices) how much the Price of a Unit of the ſecond Merchant's Commodity advance above the ready Money Rate in Barter; which having found, work according to the Bartering Prices of each, as in the laſt.

Nutmegs at 4 *s.* 4 *d.* ℔ Pound ready Money, 5 Shillings in Barter; How muſt Pepper, at 12 Pence ℔ Pound, be ſold to make the like Profit?

	s.	*d.*	*s.*	*d.*
If	4	4	5	12
	12		12	
	52		60	
			12	12
		52	720	13 :
			52	1 1 ¾ 20/52
			200	
			156	
			44	*s. d. far.*
			4	Anſwer, 1 1 ¾ 20/52
		52	176	3
			156	
			20	

Two

Two Merchants, *A.* and *B.* Barter; *A.* hath 81 Yards of Broad Cloth, worth 8 *s.* 4 *d.* ℔ Yard, ready Money, 10 *s.* in Barter; *B.* hath Cotton Greys, worth 1 *s.* 3 *d.* ℔ Yard, ready Money: I desire to know how many Yards of Cotton Greys *B.* must give *A.* for his Broad Cloth, making his Gain in Barter equal to that of A's.

d.	*d.*	*d.*
If 100	120	15

15

100 | 1800

Answer, 18 Pence.

Yd.	*s.*	*Yds.*
If 1	10	84

10

2|0 | 84|0

L. 42 0

d.	*Yd.*	*l.*	
If 18	1	42	Buy,

20

840

12

18 | 10080 | 560 Yards of Cotton Greys

90 B. must give A. for his

108 Broad Cloth.

108

..

Yds.	*l.*	*Yd.*
If 560	42	1 cost.

240

1680

84

560 | 10080 | 18 Pence ℔ Yard.

560

4480

4480

0

Two

Two Merchants, A. and B. Barter; A. hath Sugar at 1 *l.* 17 *s.* 4 *d.* ℔ Hundred, but in Barter he will have 2 *l.* 16 *s.* ℔ Hundred: B. hath Nutmegs worth 5 *l.* 12 *s.* ℔ Hundred: It's required to know how B. muſt rate his Nutmegs, to make his Gain in Barter equal to that of A's.

l.	*s.*	*d.*
1	17	4
20		
37		
12		
448		

l.	*s.*
2	16
20	
56	
12	
672	

l.	*s.*
5	12
20	
112	
12	
1344	

	D.	*D.*	*D.*
If	448	672	1344
			672
			2688
			9408
			8064

448 | 903168 | 2016 (12)

896 | 20 | 16 | 8

716

448

2688

2688

L. 8 8

Anſwer. B. muſt rate his Nutmegs at 8 *l.* 8 *s.* ℔ Hundred.

Thus much for the Rule of BARTER.

FELLOWSHIP

FELLOWSHIP *without Time.*

The Rules of PLURAL PROPORTION *is,*

TAKE the Total of all the Stocks, for the firſt Term.
The whole Gain or Loſs, for the Second.
The particular Stock of every Man, for the Third.
And work it by the *Rule of Three.*

Two Men, A. and B. bought a Parcel of Timber for 40 *l.* A. paid 16 *l.* B. paid 24 *l.* and in the Sale of it they gained 12 *l.* What is each Man's Share of the Gain?

l.	*l.*	*l.*		*l.*	*l.*	*l.*
If 40	12	16	If 40	12	24	
		12			12	
40	192	4 *l.*	40	288	7 *l.*	
	160			280		
	32			8		
	20			20		
40	640	16 *s.*	40	160	4 *s.*	
	40			160		
	240			0		
	240					
	0					

l. A. 16
B. 20
Stocks 40

Anſwer.		*l.*	*s.*	*d.*
	A. gained	4	16	00
	B. gained	7	04	00
	L.	12	00	00

Three

Three make a Joint Stock of 250 *l.* (*viz.* A. B. and C.) A. put in 25 *l.* B. put in 95 *l.* C. put in 130 *l.* and they gained 80 *l.* What belongs to each Man of the Gains?

l. *l.* *l.*
If 250 80 25

25
400
160
250|2000|8 *l.*
2000
0

l. *l.* *l.*
If 250 80 95

95
400
720
250|7600|30 *l.*
750
100
20
250|2000|8 *s.*
2000
0

l. *l.* *l.*
If 250 80 130

130
250|10400|41 *l.*
1000
400
250
150
20
250|3000|12 *s.*
250
500
500
0

Answer

		l.	*s.*
A.	gains	8	00
B.	gains	30	08
C.	gains	41	12
Proof.		80	00

A. and B. make a Joint Stock of 100 *l.* A. put in 45 *l.* B. put in 55 *l.* and they together by Trading loft 15 *l.* What belongs to each Man of this Loss?

l. *l.* *l.*
If 100 15 45

15
225
45
1|00|6|75|6 *l.*
20
15|00|15 *s.*

l. *l.* *l.*
If 100 15 55

15
275
55
L. 8|25
20
S. 5|00

		l.	*s.*
A.	loses	6	15
B.	loses	8	5
Proof,		15	0

Three

Three Tradesmen make a Joint Stock of 700 *l.* A. put in 145 *l.* B. put in 295 *l.* C. put in 260 *l.* and they gain'd 125 *l.* What belongs to each Man of the Gains?

l.	*l.*	*l.*
If 700	125	145
		125
		725
		290
		145
7	00 | 181	25
L.	25	625
		20
7	00 | 125	00
S.	17	600
		12
7	00 | 72	00
D.	10	200
		4
7	00 | 800	
far.	1	100

l.	*l.*	*l.*
If 700	125	295
		125
		1475
		590
		295
7	00 | 368	75
L.	52	475
		20
7	00 | 95	00
S.	13	400
		12
7	00 | 48	00
D.	6	600
		4
7	00 | 24	00
far.	3	300

l.	*l.*	*l.*
If 700	125	260
		260
		7500
		250
7	00 | 325	00
L.	46	300
		20
7	00 | 60	00
S.	8	400
		12
7	00 | 48	00
D.	6	600
		4
7	00 | 24	00
far.	3	300

			l.	*s.*	*d. far.*
Answer	A.	gains	25	17	10 $\frac{1}{4}$ $\frac{100}{700}$
	B.		52	13	06 $\frac{3}{4}$ $\frac{300}{700}$
	C.		46	08	06 $\frac{3}{4}$ $\frac{300}{700}$
		L.	125	00	00 Proof.

A Chap.

A Chapman breaking owes unto 4 Men the following Sums of Money, *viz.*

	l.	*s.*	*d.*	
A.	24	4	6	His whole Eſtate is found to be 54 *l.* 16 *s.* 0 *d.* I deſire to know how much each Man muſt have of the ſame, and what it will be ℔ Pound?
B.	28	5	6	
C.	35	15	4	
D.	48	14	8	
	137	00	0	

To

	l.	*s.*	*l.*		*l.*	*s.*	*d.*
If	137	1096	1	become.	54	16	0
		1			20		
	137	1096	8 *s.* ℔ Pound.		1096		
		1096					

Note. 8 Shillings is $\frac{4}{10}$ of a Pound; ſo multiply each Man's Money by 4, and divide it by 10, and the Product's each Man's Money he muſt receive, as under.

	l.	*s.*	*d.*		*l.*	*s.*	*d.*		*l*	*s.*	*d.*		*l.*	*s.*	*d.*
A.	24	4	6	B.	28	5	6	C.	35	15	4	D.	48	14	8
			4				4				4				4
	10	96	18	0	10	113	2	0	10	143	1	4	10	194	18	8

A. 9 13 $9\frac{6}{10}$ B. 11 6 $2\frac{4}{10}$ C. 14 6 $1\frac{6}{10}$ D. 19 9 $10\frac{4}{10}$

			l.	*s.*	*d.*
Anſwer	A.	muſt have	9	13	$9\frac{6}{10}$
	B.		11	06	$2\frac{4}{10}$
	C.		14	06	$1\frac{6}{10}$
	D.		19	09	$10\frac{4}{10}$
			L. 54	16	00 Proof.

THE Uſe of this Part is the ſame with the former, and differeth not in Operation, ſave in this, That every Man's Money is multiplied by his Time; and the Products of each Man's Money added together, is the firſt Number in the *Rule of Three*; the whole Gain or Loſs, the Second; the particular Stock and Time, the Third.

As the whole Stock and Time is to the whole Gain or Loſs; So is every Man's particular Stock and Time to every Man's Loſs and Gain.

Two Men make a Joint Stock for 12 Months, the firſt put in 120 *l.* the Second put in 150 *l.* and at the End, they make a Dividend of 120 *l.* which they have gained; What belongs to either Man of the ſame?

	l.			*l.*	
A.	120	Multiplied by his Time, *viz.*	12	1440	Pounds.
B.	150	Months, produces,		1800	
		Stocks and Time,		3240	

If 3240 *l.* 120 *l.* 1440 *l.*

120

3240 | 172800 | 53 *l.*

16200

10800

0720

1080

20

3240 | 21600 | 6 *s.*

19440

2160

12

3240 | 25920 | 8 *d.*

25920

0

If 3240 *l.* 120 *l.* 1800 *l.*

120

3240 | 216000 | 66 *l.*

19440

21600

19440

2160

20

3240 | 43200 | 13 *s.*

3240

10800

9720

1080

12

3240 | 12960 | 4 *d.*

12960

0

		l.	*s.*	*d.*
A.	Share,	53	06	8
B.		66	13	4
	Proof,	120	00	0

Three Men took a Piece of Ground for 10 *l.* A. put in 5 Horſes 20 Days; B. put in 8 Horſes 40 Days; and C. put in 20 Horſes 30 Days: I demand what each Man ought to pay for his Proportion of the Rent?

A.	5	20		100
B.	8	40	Produces	320
C.	20	30		600
			The Stocks and Time	1020

Days.	*S.*	*Days.*	*D.*	*S.*	*D.*	*D.*	*S.*	*D.*
If 1020	200	100	If 1020	200	320	If 1020	200	600
	200			320			600	
102|0 | 2000|0 | 19			4000			102|0 | 12000|0 | 11|7		
	102			600			102	
	980		102|0 | 6400|0 | 6|2				180	
	918			612			102	
	620			280	3 2		780	
				204			714	
				760			660	

		l.	*s.*	
Anſwer	A.	0	19	$\frac{610}{1020}$
	B. muſt pay	3	02	$\frac{760}{1020}$
	C.	5	17	$\frac{660}{1020}$
	L.	10	00	Proof.

Obſerve, the Remainders are exactly the Double of the Diviſor, and the Value of them are exactly Two Shillings.

A. B. C. makes a Joint Stock; A. put in the 1ſt of *May* 110 *l.* and on the 1ſt of *September* puts in more 290 *l.* and on the 1ſt of *January* following takes out 80 *l.* which Remainder continues in 'till the Year's End.

B. Puts in on the 1ſt of *May* 180 *l.* and on the 1ſt of *October* put in 120 *l.* more, and on the 1ſt of *February* after put in 200 *l.* and on the 1ſt of *April* takes out 120 *l.* The Remainder continues to the Year's End.

C. Put in the 1ſt of *May* 210 *l.* and on the 1ſt of *Auguſt* takes out 80 *l.* and on the 1ſt of *December* puts in 100 *l.* more; and on the 1ſt of *March* takes out 20 *l.* The Remainder continued to the Year's End: And they by Trading in one Year gained 240 *l.* What belongs to each Man of the Gains, according to his Stocks and Time?

Hence it is plain, That A. hath 110 *l.* for 4 Months, and 290 *l.* for 4 Months, and 320 *l.* for 4 Months; which 3 Products will be 2880 for A's whole Money and Time.

And it is as evident, That B. hath 180 *l.* for 5 Months, and 120 *l.* for 4 Months, and 180 *l.* for 3 Months; which 3 Sums is 1920 for B's whole Money and Time.

Alſo, it is plain, That C. hath 210 *l.* for 3 Months, and 130 *l.* for 4 Months, and 230 *l.* for 3 Months, and 210 *l.* for 2 Months; which 4 Sums added together makes 2260 for C's whole Money and Time. And each Man's Money and Time added together makes 7060, which muſt be the firſt Number in the *Rule of Three* for each of them; 240 *l.* the Gain, the ſecond Number for each of them; and every Man's particular Stock and Time, the third Number.

A.

A. *put in*	B. *put in*	C. *put in*
110 *l.* X. 4 : 440	180 *l.* X. 5 : 900	210 *l.* X. 3 : 630
290 X. 4 : 1160	120 X. 4 : 480	80 *took out.*
400	300	130 X. 4 : 520
80 *took out.*	120 *took out.*	100
320 X. 4 : 1280	180 X. 3 : 540	230 X. 3 : 690
		20
A's. 2880	B's. 1920	210 X. 2 : 420
B's. 1920		C's. 2260
C's. 2260		
7060		

Stocks and Time.

S.	*L.*	*St.*		*S.*	*L.*	*St.*		*S.*	*L.*	*Stock*	
If 7060	240	2880		If 7060	240	1920		If 7060	240	2260	
	2880				1920				2260		
	115200				76800				90400		
	5760				3840				4520		
7060	691200	97	*l.*	7060	460800	65	*l.*	7060	542400	76	*l.*
	63540				42360				40420		
	55800				37200				48200		
	40420				35300				42360		
	6380				1900				5840		
	20				20				20		
7060	127600	18	*s.*	7060	38000	5	*s.*	7060	116800	16	*s.*
	7060				35300				7060		
	57000				2700				46200		
	56480				12				42360		
	520			7060	32400	4	*d.*		3840		
	12				28240				12		
7060	6240	0	*d.*		4160			7060	46080	6	*d.*
	4				4				42360		
7060	24960	3	*far.*	7060	16640	2	*far.*		3720		
	21180				14120				4		
	3780				2520			7060	14880	2	*f.*
									14120		
									760		

Answer

			l.	*s.*	*d.*	
Answer	A.	must have	97	18	0 $\frac{1}{2}$ $\frac{2}{7}$ $\frac{1}{6}$ $\frac{0}{0}$	For his
	B.		65	05	4 $\frac{1}{2}$ $\frac{2}{7}$ $\frac{5}{6}$ $\frac{2}{0}$	part of
	C.		76	16	6 $\frac{1}{2}$ $\frac{7}{7}$ $\frac{6}{0}$ $\frac{0}{0}$	the gain

Answer, *L.* 240 00 0 Proof.

A. and B. make a Joint Stock; A. put in 40 *l.* for 5 Months; B. put in 60 *l.* for 5 Months; and they by Trading loſt 45 *l.* What muſt each Man ſuffer of this Loſs?

	l.		*l.*
A.	40	Multiplied by 5, produces	200
B.	60		300

Both their Stocks and Time 500

If 500 45 200 loſe.

200

500 | 9000 | 18 *l.*

500

4000

4000

...

If 500 45 300 loſe.

300

500 | 13500 | 27 *l.*

1000

3500

3500

...

		l.	
A.	must loſe	18	For his proportionable Part.
B.		27	

L. 45 Proof.

Thus much for FELLOWSHIP of *Whole Numbers.*

LOSS

LOSS *and* GAIN.

THIS Rule gives the Tradeſman to underſtand what is Gained or Loſt *℔ Cent.* or any other Sum in Buying and Selling Goods; And likewiſe inſtructs him how to raiſe or fall the Price of his Goods, to Gain or Loſe ſo much *℔ Cent.* or otherwiſe, either *with* or *without Time.*

Likewiſe, it being of ſuch excellent Uſe to moſt Traders, I ſhall endeavour to make it as plain as poſſible by the following Queſtions.

If I buy Cotton at 8 *d.* ℔ Pound, and ſell it at 9 *d.* What is gained ℔ *Cent.* or in laying out 100 *l.* at that Price?

Say, If 8 *d.* 9 *d.* 100 *l.*

	9			
			L.	*s.*
8	900		112	10
	8		100	00
	10		12	10 Gains.
	8			
	20			
	16			
	4			
	20			
8	80	10 *s.*		
	8			
	0			

Anſwer, 12 *l.* 10 *s.* 00 *d.* ℔ *Cent.* Gained.

If

If I buy Silk and Cotton Gowns at 10 *s.* 8 *d.* *p.* Gown, How must I sell them to gain 20 *l.* *p.* *Cent.*

Say, If 100 *l.* 120 *l.* 128 *d.*

120

1|00 | 153|60 |

12 | 153.60

12|80

12

9|60 Answer, 12 *s.* 9 $\frac{1}{5}$ $\frac{40}{100}$ *d.*

4 *p.* Gown.

2|40

If I buy one Hundred Weight of Pepper for 5 *l.* 10 *s.* and sell it again for 1 *s.* 4 *d.* *p.* Pound, Whether do I Gain or Lose, and what *p.* *Cent.*

lb. *d.* *lb.*

If 1 16 112

16

672

112

| 1792

149 4

7 9 4

5 10

20

110

12

1320

d. *d.* *l.*

If 1320 1792 100

100

1320 | 179200 | 135 *l.*

1320

4720

2960

7600

6600

1000

20

1320 | 20000 | 15 *s.*

1320

6800

6600

200

12

1320 | 2400 | 1 *d.*

1320

1080

4

1320 | 4320 | 3 *f.*

3960

360

l. *s.* *d.*

135 15 1 $\frac{3}{4}$ $\frac{360}{1320}$

100 00 0

Answ. 35 15 1 $\frac{3}{4}$ $\frac{360}{1320}$ gained by laying out 100 Pounds.

If a Bag of Cotton, weighing 220 *lb.* coſt 6 *l.* 8 *s.* 4 *d.* how muſt one Pound be ſold, to gain 12 *l.* 10 *s.* ℔ *Cent.*

l.	*l.*	*s.*	*d.*
If 100	112	10	7
20	20		
2000	2250		
	7		
2|000	15|750		
Pence 7 :	1750		
	4		
2|000	7|000	Anſwer,	7 *d.* ¾ *f.* ¼
	3 : 1000		

lb.	*l.*	*s.*	*d.*	*lb.*
If 220	6	8	4	1
	20			
	128			
	12			
220 |	1540 |	7 *d.* ℔ *lb.*	
	1540			
	0 Incon.			

A *Blackburn* Tradeſman bought Yarn at 6 *s.* the Bundle, which not proving ſo good as expected, was minded to ſell it ſo as to loſe 9 *l.* ℔ *Cent.* What muſt a Bundle be ſold at?

l.	*l.*	*s.*
If 100	91	6
	6	
Shillings 5|46		
	12	
Pence 5|52		
	4	
Farthings 2|08		

	s.	*d.*	*f.*
Anſwer,	5	5	½ $\frac{48}{100}$

A Merchant going to a Market ſold Fuſtians at 12 *s.* 6 *d.* the End wherein was gained 15 *l.* ℔ *Cent.* and finding no other Tradeſman had ſo good raiſeth them at the latter end of the Fair to 13 *s.* 4 *d.* I demand to know what was gained ℔ *Cent.* by this laſt Sale.

s.	*d.*	*l.*	*s.*	*d.*	
If 12	6	15	13	4	Gain.
12			12		
150			160		
			15		
			800		
			160		
		150	2400		16 *l.*
		150			
		900			Anſwer, 16 *l.* gained
		900			by the laſt Sale.

If I buy Gartering at 10 *s.* the Groſs; how many Yards may I ſell for a Penny, to gain 22 *l.* ℔ *Cent.*

l.	*l.*	*s.*	
Say, If 100	122	10	} Then multiply 24, the Pieces in a Groſs, by 36, the Yards in a Piece.
	10		
s. 12	120		864 Yards.
	12		
d. 2	40		
	4		
f. ¼	60		

s.	*d.*		*Yds.*	*d.*	
If 12	2¼	60/100	864	1	
	12		4	4	
	146	645	3456	4	5 Yds. & 231/645
	4		3225		
	585		231		
	60				
	645				

Anſwer, 5 Yards and 1 Foot: fere.

A Cheesemonger bought 20 Ton of Cheese, with which he went from *Preston* to *Dublin*; it cost him 400 *l.* the Freight, and Custom came to 50 *l.* his own Expences and Charges came to 16 *l.* 13 *s.* 4 *d.* How must he sell it ℔ Pound to gain 20 *l.* ℔ *Cent.* by it.

Collect the Cost and Charges into one Sum, and say,

l. *l.* *l.* *s.* *d.*

If 100 become 120, what will 466 13 4 become?

	l.	*s.*	*d.*
Cost first Penny,	400	00	0
Freight and Custom,	50	00	0
His own Charges,	16	13	4
The whole Cost,	466	13	4

l. *l.* *l.* *s.* *d.*

If 100 120 466 13 4

20

9333

12

112000

120

100 | 134400 | 00

12 | 134400

20 | 11200

L. 560

20 *C.* is one Ton.

4

80

28

640

160

2240

20 Hundred of Cheese.

44800

lb. *l.* *lb.*

Then say, If 44800 560 1

20

11200

12

44800 | 134400 | 3 *d.*

134400

00

Answer, He must sell it at 3 *d.* ℔ Pound.

Hill's Arithmetick, Page 290.

A Meal-Man selling Meal at 20 *s.* the Load, wherein was gain'd 12 *l.* *p.c.* but being by a falling Market obliged to sell it for 16 *s.* *p.* Load, What did he Gain or Lose by the last Sale?

s.	*L.*	*s.*
If 20	112	16
	16	
	672	
	112	
20	179 2	89 *l.* 12 *s.*
	16	
	19	
	18	
	12	

l.	*s.*	*d.*
100	00	0
89	12	0
10	08	0

Ans. Lost 10 08 0 by the latter Sale.

If I buy Potatoes by Wholesale at 4 *s.* 6*d.* *p.* Load, and sell the same again at 6 *s.* 8 *d.* by Retail, What do I gain *p.c.*

s.	*d.*	*s.*	*d.*	*l.*
If 4	6	6	8	100 become.
12		12		80
54		80		

54 | 8000 | 148 2 11 $\frac{1}{2}$ $\frac{12}{54}$

54
260
216
440
432
8
20
54 | 160 | 2
108
52
12
54 | 624 | 11
54
84
54
30 remains.

l.	*s.*	*d.*
148	2	11 $\frac{1}{2}$ $\frac{12}{54}$
100	0	00

Answ. 48 2 11 $\frac{1}{2}$ $\frac{12}{54}$ is gained *p.c.* by retailing them.

4
54 | 120 | 2 *far.*
108
12

If I buy Yarn for 9 *d.* and ſell it for 12 *d.* ℔ Pound, and allow 3 Months for Payment, What do I gain ℔ *Cent.* ℔ *Annum?*

This Queſtion admits of a Double Meaning, and by that Means of a Double Anſwer.

For firſt, it is evident, if he on this Sale had received ready Money, he would have gained 33 *l.* 6 *s.* 8 *d.* ℔ *Cent.* but giving 3 Months for Payment, his Gain muſt needs be leſs, by as much as the Rebate of 133 *l.* 6 *s.* 8 *d.* for 3 Months amounts to 1 *l.* 19 *s.* 5 *d.* which ſubtracted from 33 *l.* 6 *s.* 8 *d.* the Remainder is 31 *l.* 7 *s.* 3 *d.* the Gain ſought.

So he makes his 100 *l.* to be 131 *l.* 7 *s.* 3 *d.*

But ſome Authors would anſwer the Queſtion thus, If 9 *d.* 12 *d.* 100 *l.* Anſwer 133 *l.* 6 *s.* 8 *d.* as before.

But inſtead of making his Gain leſs by giving Time, they make it vaſtly more thus: For they ſay,

If 3 Months gain 33 *l.* 6 *s.* 8 *d.* what will 12 Months gain? Anſwer, 133 *l.* 6 *s.* 8 *d.* the Gain ſought.

N. B. That 6 ℔ *Cent.* is allowed Simple Intereſt for Rebate in the Queſtion; that being the Rate allowed by the Statute.

M.	*l.*	*M.*		*l.*	*s.*	*l.*	*s.*	*l.*	*s.*	*d.*	
If 12	6	3	If	101	10	1	10	133	6	8	Rebate.

3

12 | 18 | 1 *l.* 10 *s.*

12

6

20

12 | 120 | 10 *s.*

8

Anſwer, 1 *l.* 19 *s.* 5 *d.* fere.

REBATE

REBATE *and* DISCOUNT.

REBATE or DISCOUNT is when a Sum of Money, due at any Time to come, is satisfied by the Payment of ſo much Money in Hand, as being put forth at a certain Rate of Intereſt for the Time being, will be equal to the Sum firſt due.

In *Rebate*, 12 Months is the firſt Number, the Rate of Intereſt the Second, and the Time propoſed the third Number.

Then ſay, If 100 *l.* and that Anſwer added together, abate that Anſwer, what will the Given Sum Rebate?

The Quotient or Quotients ſhews the *Rebate*, which taken from the Given Sum, ſhew what Money muſt be paid in Hand.

What's the Rebate of 560 *l.* for 9 Months, at 6 *l. per Cent.*

M.	*l.*	*M.*
If 12	6	9
		9
12 | 54 | 4 *l.* 10 *s.*		
48		
6		
20		
12 | 120 | 10 *s.*		
12		
0		

	l.	*s.*	*d.*
Given Sum,	560	00	0
Rebated,	24	02	$3\frac{1}{2}$ $\frac{456}{2090}$
Paid in Hand,	535	17	$8\frac{1}{2}$ 1840

l.	*s.*	*l.*	*s.*	*l.*
If 104	10	4	10	560
20		20		
2090		90		
		560		
		5400		
		450		
2090 | 50400 | 24 *l.*				
4180				
8600				
8360				
240				
20				
2090 | 4800 | 2 *s.*				
4180				
620				
12				
2090 | 7440 | 3 *d.*				
6270				
1170				
2				
2090 | 2340 | $\frac{1}{2}$				
2090				
250				

What's the Rebate of 765 *l.* 12 *s.* 6 *d.* for 14 Months, at 6 *l. per Cent. per Month.*

M. *l.* *l.* *l.* *s.* *l.* *s.* *d.*

Say, If 12 6 14 Then say, If 107 7 765 12 6

6

12 | 84 | 7

84

0

20

15312

12

183750

7 12

107 | 1286250 | 12021

107

216 160 | 1 9

214

225 50 1 9

214

110

107

3

l. *s.* *d.*

Given Sum, 765 12 6

Rebated, 50 01 9 $\frac{3}{107}$

Paid in Hand, 715 10 8 $\frac{104}{107}$

What's the Rebate of 999 *l.* at 5 *l. per Cent.* for 16 Months.

M. *l.* *M.* *l.* *s.* *d.* *l.* *s.* *d.* *l.*

If 12 5 16 If 106 15 4 6 13 4 999

5

20 20

12 | 80 | 6*l.* 13*s.* 4*d.* 2133 133

72 12 12

8 25600 1600

20 999

12 | 160 | 13 14400

12 14400

14400

40

36 256|00 | 15984|00 | 62 *l.* 8 *s.* 9 *d.*

4 1536

12 624

12 | 48 | 4 512

48 11200

0 20

| 2240|00 | 8

2048

19200

12

l. *s.* *d.* | 2304|00 | 9

Given, 999 0 0 2304

Rebate, 62 8 9 0000

Answer, 936 11 3

A Merchant from *London*, buys at *Blackburn* in *Lancaſhire*, 10 Packs of fine Cotton Cheques; each Pack had 32 Pieces, at 1 *l.* 2 *s.* 6 *d.* ℔, and was to pay for one Half of the Goods in Cotton-Wool in Hand, at 10 *d.* ℔ Pound: The other Half of the Goods he was to have Credit 6 Months; but the Merchant changing his Mind was content to pay the Money in Hand, that ſhould have been at 6 Months end, if the Tradeſman would allow him Rebate, after 6 *l.* ℔ *Cent.* ℔ *Annum*; to which he Aſſents: I demand the Sum to be paid in Hand, and what the Cheques would come to, and the Weight of the Cotton-Wool, the Tradeſman muſt receive, at 10 *d.* ℔ Pound?

First, Find what the 10 Packs will come to, which by the Work you ſee to be 360 *l.* Then Half that Sum muſt be taken, which is 180 *l.* which Sum muſt be paid in Cotton, at 10 *d.* ℔ Pound, and the ſame Sum, *viz.* 180 *l.* muſt have Rebate for ſix Months, at 6 *l.* ℔ *Cent.* ℔ *Annum.*

	l.	*s.*	*d.*	
Thus,	1	2	6	℔
			8	& 4
	9	0	0	
			4	
	36	0	0	
			10	Packs
½	360	0	0	
	180	0	0	

20

If 10 . 1 43200 3600
1 12
10 | 4320 | 0 43200

Anſwer, 4320 Pounds of Cotton.

Then

Then to find the Rebate of 180 *l.* for 6 Months, at 6 *l. per Cent.*

M. l. M. *l. l. l.*

Say, If 12 6 6 Then say, If 103 3 180

6 6

12 | 36 | 3 *l.* 103 | 540 | 5 *l.*

30 515

0 25

20

l. s. d. 103 | 500 | 4 *s.*

Given Sum, 180 00 00 412

Sum Rebated, 5 04 10 $\frac{1}{4}$ $\frac{1}{103}$ 88

12

Paid in Hand, 174 15 01 $\frac{1}{4}$ $\frac{103}{103}$ 103 | 1056 | 10 *d.*

103

Answer, The Tradesman must receive 4320 *lb.* of Cotton Wool, and 174 *l.* 15 *s.* 1 *d.* $\frac{1}{4}$ $\frac{1}{103}$ for his Cheque Pieces in Hand. 26

4

103 | 104 | 1 *f.*

103

1

What's the Rebate of 250 *l.* the one Half to be paid in 3 Months, and the other Half in 6 Months, at 5 *l. per Cent. per An.*

l. s. l. s. l. 250

Say, If 12 5 3 If 101 5 1 5 125 125

3 20 25

Then say, 12 | 15 | 1 *l.* 5 *s.* 2025 625 If 102 10 2 10 125

If 12 5 6 12 250 20 50

5 2050

3 2025 | 3125 | 1 2050 | 6250 | 3

12 | 30 | 2 10 20 2025 6150

24 1100 100

12 | 60 | 5 20 20

6 60 2025 | 22000 | 10 2050 | 20000 | 0

12 10 *s.* 2025 12

1750 2050 | 24000 | 1 *l.*

l. s. d. 12 2050

250 00 00 2025 | 21000 | 10 3500

1 10 10 $\frac{750}{2025}$ 20250 2050

3 00 11 $\frac{1450}{2025}$ 750 1450

Rebate, 4 11 10

In Hand, 245 08 02

What's the Discount of 6784 *l.* for 2 Three Months; that's Half at 3 Months, and the other Half at 3 Months after: If all the Money be paid in Hand, what must be Discounted, after 6 *l.* *per Cent. per Annum?*

M.	*l.*	*M.*
If 12	6	3
		3
12 | 18 | 1 *l.* 10 *s.*		
		12
		6
		12 10

M.	*l.*	*M.*
If 12	6	6
		6
12 | 36 | 3		
		36

l.	*l.*	*l.*
If 103	3	3392
		3
103 | 10176 | 98 *l.*		
		027
		906
		824
		82
		20
103 | 1640 | 15 *s.*		
		103
		610
		515
		95
		12
103 | 1140 | 11 *d.*		
		103
		110
		103
		7
		4
		28

l.	*s.*	*l.*	*s.*	*l.*	
If 101	10	1	10	3392	
	20		20		30
	2030		30		
2030 | 101760 | 50 *l.*					
				10150	
				269	
					20
2030 | 5200 | 2 *s.*					
				4060	
				1140	
					12
2030 | 13680 | 6 *d.*					
				12180	
				1500	
					4
2030 | 6000 | 2 *f.*					
				4060	
				1040	

	l.	*s.*	*d.*
	6784	00	00
for 3 Months,	50	02	06 $\frac{1}{2}$ $\frac{1}{2}\ \frac{1}{20}\ \frac{4}{30}\ \frac{28}{103}$
for 6 Months,	98	15	11
All the Disc.	148	18	05 $\frac{1}{2}$
To be paid	6635	01	06 $\frac{1}{2}$

EQUATION *of* PAYMENTS.

WHEN ſeveral Sums of Money are due at ſeveral Times, and the Debtor and Creditor agrees to make but one Payment of the Whole, it may be done without Loſs to either, by this RULE.

Multiply every Sum of Money as it becometh due, and Divide the Sum of the Products by the Total Debt, and the Quotient is the true Time at which the Whole ought to be paid.

Admit, I have 1200 *l.* owing me, to be paid at 4 ſeveral Payments, *viz.* 500 *l.* at 2 Months End, 300 *l.* at 6 Months, 200 *l.* at 10 Months, and 200 *l.* at 12 Months; the Queſtion is, at what Time the Whole ought to be paid, without Wrong on either Side.

l.		*Months.*		*l.*	
500	Multiplied by	2	is	1000	Products.
300		6		1800	
200		10		2000	
200		12		2400	

1200 Diviſor.

1200 | 7200 | 6 Months.
7200

00

The Money all muſt be paid at the End of 6 Months; and ſo of any other.

EXCHANGE.

I Might, as a Preface, ſay a great deal about the *Exchanging* of *Coins*, but ſhall content myſelf with only Writing a Specimen of the ſeveral Country's Coins as I come to them, and tell you what they keep their Accompts in, and upon what Conditions they *Exchange* with *England*, which will be moſt uſeful for Learners: Therefore ſhall endeavour to make it as plain as poſſible.

ENGLAND *with* FRANCE.

AT *Paris*, *Lyons*, *Rowen*, and ſeveral other Places in *France*, they keep their Accompts in *Livres*, *Sols*, and *Deniers*, and Exchange upon the Crown; the Par of which, with *London* and other Places in *England*, in Sterling Money, is 4 Shillings and 6 Pence.

N. B. 12 Deniers is one Sol, 20 Sols is one Livre, 3 Livres is one Crown, of 4 *s.* 6 *d.* ℔, being one *French* Crown.

A Mer-

A Merchant at *London* remits to his Correſpondent at *Paris* the Value of 719 *l.* 16 *s.* 8 *d.* Sterling; the Exchange at 54 *d.* or 4 *s.* 6 *d.* per Crown, What muſt be paid at *Paris*?

d.	*Cr.*	*l.*	*s.*	*d.*
If 54	1	719	16	8
		20		
		14396		
		12		
54	172760	3199	2	15 $6\frac{26}{54}$ Answ.

Cr. Liv. Sol. Deniers.

162

107

54

536

486

500

486

14

3

54 | 42 | 0 Livres.

20

54 | 840 | 15 Sols.

54

300

270

30

12

54 | 360 | 6 Deniers.

324

36

Paris remits to *London* 3199 Crowns, 0 Livres, 15 Sols, $6\frac{56}{54}$ Deniers; the Exchange at 4s. 6d. ℔ Crown; What Number of Pounds, Shillings and Pence muſt be drawn at *London* for this Remittance?

	Cr.	*d.*	*Cr.*	*Liv.*	*Sol.*	*Deniers.*
If	1	54	3199	0	15	$6\frac{56}{54}$
	3		3			
	3		9597			
	20		20			
	60		191955			
	12		12			
	720		2303466			
			54			
			9213870			
			11517333			
	72|0		12438720|0		12 172760	
			72		1439.6 8 *d.*	
			523		*L.* 719 16 8 Anſwer,	
			504		and Proof.	
			198			
			144			
			547			
			504			
			432			
			432			
			00			

Liverpool

Liverpool remits to *Lyons* 564 *l.* 10 *s.* 8 *d.* Sterling; the Exchange at 55 *d.* ℔ Crown; What muſt be Drawn, and whether Place gains by this Remittance? And let the Anſwer be in Livres, Sols, and Deniers, in which the French keep their Accompts, as ſaid before.

d.	*Livres*	*l.*	*s.*	*d.*
If 55	3	564	10	8
		20		
		11290		
		12		
		135488		
		3		
55	406464	7390		

d.	*d.*	*d.*			
If 55	1	135488	gain	214	*Liv. Sols De.*
	1			165 Anſ.	7390 5 $1\frac{5}{55}$
	12			496	
55	135488	2463		495	and *France* gains
110		*d.*		1	*L. s. d.*
254		205 | 3		14	*L.* 10 5 3 $\frac{13}{55}$
220	*l.* 10 5 3 $\frac{13}{55}$			20	
348			55	280	5
330				275	
188				5	
165				12	
23			55	60	1
				55	
				5	

Lyons remits to *Liverpool* 7390 Livres, 5 Sols, 1 $\frac{5}{11}$ Deniers; the Exchange at 55 Pence for 3 Livres, or 1 French Crown; What muſt be drawn at *Liverpool* for this Remittance?

	Livres	*D.*	*Livres*	*Sols*	*Denier*
If	3	55	7390	5	1 $\frac{5}{11}$

20

147805

12

1773661

55

8868310

8868305

12

72|0|9755136|0| 135488

72 — 2|0 | 1129|0 8 *d.*

255

216 Anſ. *L.* 564 10 8

395

360

351

288

633

576

576

576

0

ENGLAND *with* ITALY.

ENGLAND gives to *Italy*, and Firſt to *Genoa*, from 46 *d.* to 76 *d.* for one Piece of Eight of 5 Livers, equal to 6 Shillings Sterling.

Second, *England* gives to *Leghorn* from 43 *d.* to 78 *d.* Sterling, for one Piece of Eight of 6 Livres, equal to 7 *s.* 6 *d.* Sterling: They keep their Accompts in Livres, Sols, and Deniers; and Exchange upon the Piece of Eight, the Par of which with *England*, is commonly at 4 *s.* 6 *d.* ℔. *Li-*

Liverpool remits to *Genoa* 549 *l.* 13 *s.* 8 *d.* the Exchange at 66 *d.* ℔ Piece of Eight; What muſt be drawn at *Genoa* for this Draught?

	d.	*Liv.*	*l.*	*s.*	*d.*
If	66	5	549	13	8

20

10993

12

131924

5

Liv. Sols. Deniers.

66 | 659620 | 9994 4 10 $\frac{1}{66}$ Anſwer.

594

656

594

622

594

280

264

16

20

66 | 320 | 4

264

56

12

66 | 672 | 10

66

12

Liv. Sol. Deniers.

Genoa remits to *Blackburn* 9994 4 10 $\frac{12}{66}$ the Exchange at 66 *d.* ℔ Piece of Eight; What muſt be Drawn at *Blackburn* for this Remittance.

	Liv.	*d.*	*Liv.*	*Sols.*	*Deniers.*
If	5	66	9994	4	10 $\frac{12}{66}$
	20		20		
	100		199884		
	12		12		
	1200		2398618		
			66		
			14391710		
			14391709		
			12|00 | 1198088|00		
			12 | 131924		
			2|0 | 10993		8 *d.*

L. 549 13 8 Anſwer.

Mancheſter Draws upon *Leghorn* for 570 *l.* 12 *s.* 6 *d.* Sterling; The Exchange at 55 *d.* ℔ Piece of Eight of 6 Livres; What muſt be paid at *Leghorn* for this Remittance?

	d.	*Liv.*	*l.*	*s.*	*d.*
If	55	6	570	12	6
			20		
			11412		
			12		
			136950		
			6		
			55 | 821700 | 14940 Livres. Anſwer.		
			55		
			271		
			220		
			517		
			495		
			220		
			220		
			00		

Leghorn

Leghorn Draws upon *Bolton in the Moors* for 14940 Livres; The Exchange at 55 *d.* ℔ Piece of Eight of 6 Livres; What muſt be drawn at *Bolton* for this Draught?

	Liv.	*d.*	*Livres.*
If	6	55	14940
			55
			74700
			74700
	6		821700
	12		136950
	2|0		11412 6 *d.*
			L. 570 12 6 Anſwer.

Thus much for *Leghorn*: Theſe Queries being Proof to each other; and in the former Quere there being an equal Number of Livres, without any Remainder; but if there had been any, you muſt have proceeded in the ſame Way for Sols and Deniers, as I did in the aforegoing Queries to *Genoa*.

ENGLAND *with* HOLLAND.

LONDON Exchanges with *Holland*, and all the Low Countries, upon ſo many Shillings and Pence *Flemiſh* for the Pound Sterling: The Par being 33 *s.* 4 *d.* ℔ Pound *Flemiſh* for the Pound Sterling, or 20 Shillings.

Likewiſe, in the Low Countries they have the following Coins, and by which they many Times return their Bills: The Names and Value in *Engliſh* Money are as follows.

	Value in Engliſh.		
8 Pennicks is one Groat,	*l.*	*s.*	*d.*
2 Groats is one Stiver,	0	00	01 1/5
6 Stivers is one Shilling *Flemiſh*,	0	00	07 1/5
20 Stivers is one Gilder,	0	02	00
6 Gilders is 1 *l. Flemiſh* of 20 *s.* ℔	0	12	00
33 *s.* 4 *d. Flemiſh*, or 10 Gilders,	1	00	06
An Embden Dollar,		2	03 3/5
A Campen Dollar,		2	07 1/5
A Zealand Dollar,		3	00
A Lyons Dollar,		4	00
A Specie Dollar,		5	00
A Duckatoon,		6	03 3/5

To explain the former Part of this Coin a little further, take the Rule following;

N. B. 8 Pennicks is one Groat, 2 Groats is one Stiver, 20 Stivers is one Gilder, and 10 Gilders is one Pound Sterling.

London remits to *Amsterdam* 124 *l.* 15 *s.* 8 *d.* The Exchange at 33 *s.* 2 *d.* ℔ Pound *Flemish* for 20 *s.* Sterling; What Number of Gilders, Stivers, Groats and Pennicks must be drawn for this Remittance?

s.	*d.*	*Gil.*	*l.*	*s.*	*d.*
If 33	2	10	124	15	8
12			20		
398			2495		
			12		

398 | 299480 | 752 Gilders.
2786
2088
1990
980
796
184
20

398 | 3680 | 9 Stivers.
3582
98
2

398 | 196 | 0 Groat.
8

398 | 1568 | 3 Pennicks.
1194
374

Instead of Multiplying by 10, I added a Cypher to the Dividend.

	Gild.	*St.*	*Gr.*	*Pennicks.*
Answer,	752	9	0	3 $\frac{374}{398}$

Amsterdam

Amsterdam remits to *London* a Bill of Exchange for the Value of 752 Gilders, 9 Stivers, 0 Groat, 3 $\frac{3}{39}\frac{14}{16}$ Pennicks; The Exchange at 33*s.* 2*d.* for 10 Gilders; What Number of Pounds, Shillings and Pence must be drawn in *London* for this Bill?

	Gild.	*s.*	*d.*	*Gil.*	*St.*	*Gil.*	*Pennicks.*
If	10	33	2	752	9	0	3 $\frac{3}{39}\frac{14}{16}$
	20	12		20			
	200	398		15049			
	2			2			
	400			30098			
	8			8			
	32|00			240787			
				398			
				1926300			
				2167090			
				722364			

12

32|00 | 958336|00 | 29948

64

318

288

303

288

153

128

256

256

0

2|0 | 249|5 8

L. 124 15 8

The Answer.

Manchester

Manchester remits to *Holland* 325 *l.* 6 *s.* 8 *d.* Sterling, to receive the same in Exchange, at 33 *s.* 4 *d.* ℔ Pound *Flemish* for the 20 *s.* Sterling; What must be drawn at *Holland* for this Remittance?

I show'd the same Method of Working in *Reduction*, which I am going to show again now, but did not fully explain it.

Consider, that when the Par of Exchange is at 33 *s.* 4 *d.* (which is the common Par) then the Answer is sooner found by Multiplying by 5 and Dividing by 3, if the Question be given in Sterling Money; but if it be given in *Flemish* Money, you must Multiply by 3 and Divide by 5, for 400 Pence *Flemish* is equal to 240 Pence Sterling, each being a Pound; for if you Divide 240 by 3, it Quotes 80, so 400 divided by 5 Quotes the same.

The Question last done by this Method.

l.	*s.*	*d.*			*l.*	*s.*	*d.*		
325	6	8 Sterl.	℔ *Contra*		542	4	$5\frac{1}{4}\frac{1}{3}$		
	5					3			*Flemish.*
3 | 1626	13	4			5 | 1626	13	4		
Ans. 542	4	$5\frac{1}{4}\frac{1}{3}$			Ans. 325	6	8	Sterl.	
Flemish.					and Proof.				

Campen

Campen remits to *Haſlingden* 360 Dollars; the Exchange at 31 *d.* $\frac{1}{2}$ ℔ Dollar, What muſt be drawn at *Haſlingden* for this Remittance?

Dol.	*d.*	*Dol.*
If 1	31 $\frac{1}{2}$	360
5		156
156		2160
		1800
		360
5		56160
12		11232
2	0	93 6

L. 46 16 0 Anſwer.

Or thus,

Dol.	*d.*
360 at	31 $\frac{1}{2}$
	31 $\frac{1}{2}$
	360
	1080
	72 this is $\frac{1}{2}$
12	11232
	936

L. 46 16 Anſwer.

Haſlingden remits to *Campen* 46 *l.* 16 *s.* to receive the ſame in Dollars, at 31 *d.* $\frac{1}{2}$ ℔, How many muſt be received?

d.	*Dol.*	*d.*		*l.*	*s.*
If 31 $\frac{1}{2}$	1 :	11232		46	16
5	5	5		20	
156	5	156 56160	360 Dollars.	936	
		468	Anſwer.	12	
		936		11232	Pence
		936			
		0			

England *with* Portugal.

ENGLAND gives to *Lisbon* and *Oporto* 50*d.* to 78 *d.* Sterling, for 1000 Reas, or one Millrea, the Par of which with *England* is about 6 *s.* 8 *d.* $\frac{1}{2}$ Sterling; 1000 Reas is one Millrea, of the Value of 6 *s.* 8 *d.* Sterling Money.

A TABLE, shewing the Value of any Number of Foreign Gold, in *English* Pounds, Shillings, and Pence.

Numb of pieces.	Double Joanniff. l. 3 12 0	Single Joanniff. l. 1 16 0	Moidores. l. 1 7 0	Louis d' Ors. l. 1 4 0	Piſtoles. l. 0 16 6
1	3 12	1 16	1 7	1 4	0 16 6
2	7 4	3 12	2 14	2 8	1 13 0
3	10 16	5 8	4 1	3 12	2 9 6
4	14 8	7 4	5 8	4 16	3 6 0
5	18 0	9 0	6 15	6 0	4 2 6
6	21 12	10 16	8 2	7 4	4 19 0
7	25 4	12 12	9 9	8 8	5 15 6
8	28 16	14 8	10 16	9 12	6 12 0
9	32 8	16 4	12 3	10 16	7 8 6
10	36 0	18 0	13 10	12 0	8 5 0
20	72 0	36 0	27 0	24 0	16 10 0
30	108 0	54 0	40 10	36 0	24 15 0
40	144 0	72 0	54 0	48 0	33 0 0
50	180 0	90 0	67 10	60 0	41 5 0
60	216 0	108 0	81 0	70 0	49 10 0
70	252 0	126 0	94 10	84 0	57 15 0
80	288 0	144 0	108 0	96 0	66 0 0
90	324 0	162 0	121 10	108 0	74 5 0
100	360 0	180 0	130 0	120 0	82 10 0
200	720 0	360 0	270 0	240 0	165 0 0
300	1080 0	540 0	405 0	360 0	247 0 0
400	1440 0	720 0	540 0	480 0	330 0 0
500	1800 0	900 0	675 0	600 0	412 10 0
600	2160 0	1080 0	810 0	720 0	495 0 0
700	2520 0	1260 0	945 0	840 0	577 10 0
800	2880 0	1440 0	1080 0	960 0	660 0 0
900	3240 0	1620 0	1215 0	1080 0	742 10 0
1000	3600 0	1800 0	1350 0	1200 0	825 0 0
5000	18000 0	9000 0	6750 0	6000 0	4125 0 0
10000	36000 0	18000 0	13500 0	10000 0	8250 0 0

London remits to *Lisbon* 5000 *l.* to receive the ſame in Double Joanniſſes; How many muſt be received for this Remittance?

	l.	*s.*	*D.*	*l.*	
If	3	12	1	5000	
				20	
					Double Joanniſ.
			72	100000	1388 $\frac{64}{72}$
				72	
This Queſtion proved by				280	
the foregoing Table.				216	
				640	
				576	
				640	
				576	
				64	

			l.	*s.*	*d.*
Firſt,	1000	Double Joanniſſes is	3600	0	0
	300	Ditto is	1080	0	0
	80	Ditto is	288	0	0
	8	Ditto is	28	16	0
Remains	64	Shillings, equal to	3	4	0
Anſwer and Proof,			*L.* 5000	00	0

Portugal

Portugal remits to *England* 5000 Single Joanniſſes, at 1 *l.* 16 *s.* ℔; How many Pounds Sterling muſt be received at *England* for this Remittance?

	Sin. J.	*l.*	*s.*	*Single Joanniſſes.*
If	1	1	16	5000
		20		36
		36		30000
				15000
			2/0	18000/0

L. 9000 0 0 Anſwer.

This needs no further explaining, for look in the foregoing Table for 5000, which you may find in the firſt Column towards the Left-Hand, and look for *Single Joanniſſes* at the Top of the Table, which you may find in the Third Column, and down againſt 5000 you will find 9000 Pounds; and ſo of any other.

A TABLE,

A TABLE, shewing how much Sterling Money is contained in any Number of Crowns, Dollars, Ducats, Piastres, Pieces of Eight *Flemish*, from 1 to 3000.

N° of pieces	40 d. ℔	41 d. ℔	42 d. ℔	43 d. ℔
1	l. 0 3 8	l. 0 3 5	l. 0 3 6	l. 0 3 7
2	0 6 8	0 6 10	0 7 0	0 7 2
3	0 10 0	0 10 3	0 10 6	0 10 9
4	0 13 4	0 13 8	0 14 0	0 14 4
5	0 16 8	0 17 1	0 17 6	0 17 11
6	1 0 0	1 0 6	1 1 0	1 1 6
7	1 3 4	1 3 11	1 4 6	1 5 1
8	1 6 8	1 7 4	1 8 0	1 8 8
9	1 10 0	1 10 9	1 11 6	1 12 3
10	1 13 4	1 14 2	1 15 0	1 15 10
20	3 6 8	3 8 4	3 10 0	3 11 8
30	5 0 0	5 2 6	5 5 0	5 7 6
40	6 13 4	6 16 8	7 0 0	7 3 4
50	8 6 8	8 10 10	8 15 0	8 19 2
60	10 0 0	10 5 0	10 10 0	10 15 0
70	11 13 4	11 19 2	12 5 0	12 10 10
80	13 6 8	13 13 4	14 0 0	14 6 8
90	15 0 0	15 7 6	15 15 0	16 2 6
100	16 13 4	17 1 8	17 10 0	17 18 4
200	33 6 8	34 3 4	35 0 0	35 16 8
300	50 0 0	51 5 0	52 10 0	53 15 0
400	66 13 4	68 6 8	70 0 0	71 13 4
500	83 6 8	85 8 4	87 10 0	89 11 8
600	100 0 0	102 10 0	105 0 0	107 10 0
700	116 13 4	119 11 8	122 10 0	125 8 4
800	133 6 8	136 13 4	140 0 0	143 6 8
900	150 0 0	154 15 0	157 10 0	161 5 0
1000	166 13 4	170 16 8	175 0 0	179 3 4
2000	333 6 8	341 13 4	350 0 0	358 6 8
3000	500 0 0	512 10 0	525 0 0	537 10 0

N°

N° of Pieces	44 d. ℔			45 d. ℔			46 d. ℔			47 d. ℔		
1	l. 0	3	8	0	3	9	0	3	10	0	3	11
2	0	7	4	0	7	6	0	7	8	0	7	10
3	0	11	0	0	11	3	0	11	6	0	11	9
4	0	14	8	0	15	0	0	15	4	0	15	8
5	0	18	4	0	18	9	0	19	2	0	19	7
6	1	2	0	1	2	6	1	3	0	1	3	6
7	1	5	8	1	6	3	1	6	10	1	7	5
8	1	9	4	1	10	0	1	10	8	1	11	4
9	1	13	0	1	13	9	1	14	6	1	15	3
10	1	16	8	1	17	6	1	18	4	1	19	2
20	3	13	4	3	15	0	3	16	8	3	18	4
30	5	10	0	5	12	6	5	15	0	5	17	6
40	7	6	8	7	10	0	7	13	4	7	16	8
50	9	3	4	9	7	6	9	11	8	9	15	10
60	11	0	0	11	5	0	11	10	0	11	15	0
70	12	16	8	13	2	6	13	8	4	13	14	2
80	14	13	4	15	0	0	15	6	8	15	13	4
90	16	10	0	16	17	6	17	5	0	17	12	6
100	18	6	8	18	15	0	19	3	4	19	11	8
200	36	13	4	37	10	0	38	6	8	39	3	4
300	55	0	0	56	5	0	57	10	0	58	15	0
400	73	6	8	75	0	0	77	13	4	78	6	8
500	91	13	4	93	15	0	95	16	8	97	18	4
600	110	0	0	112	10	0	115	0	0	117	10	0
700	128	6	8	131	5	0	135	3	4	137	1	8
800	146	13	4	150	0	0	155	6	8	156	13	4
900	165	0	0	168	15	0	173	10	0	176	5	0
1000	183	6	8	187	10	0	191	13	4	195	16	8
2000	366	13	4	375	0	0	383	6	8	391	13	4
3000	550	0	0	562	10	0	575	0	0	587	10	0

N° of Pieces	48 d. ℔			49 d. ℔			50 d. ℔			51 d. ℔		
1	l. 0	4	0	0	4	1	0	4	2	0	4	3
2	0	8	0	0	8	2	0	8	4	0	8	6
3	0	12	0	0	12	3	0	12	6	0	12	9
4	0	16	0	0	16	4	0	16	8	0	17	0
5	1	0	0	1	0	5	1	0	10	1	1	3
6	1	4	0	1	4	6	1	5	0	1	5	6
7	1	8	0	1	8	7	1	9	2	1	9	9
8	1	12	0	1	12	8	1	13	4	1	14	0
9	1	16	0	1	16	9	1	17	6	1	18	3
10	2	0	0	2	0	10	2	1	8	2	2	6
20	4	0	0	4	1	8	4	3	4	4	5	0
30	6	0	0	6	2	6	6	5	0	6	7	6
40	8	0	0	8	3	4	8	6	8	8	10	0
50	10	0	0	10	4	2	10	8	4	10	12	6
60	12	0	0	12	5	0	12	10	0	13	15	0
70	14	0	0	14	5	10	14	11	8	14	17	6
80	16	0	0	16	6	8	16	13	4	16	0	0
90	18	0	0	18	7	6	18	15	0	19	2	6
100	20	0	0	20	8	4	20	16	8	21	5	0
200	40	0	0	40	16	8	41	13	4	42	10	0
300	60	0	0	61	5	0	62	10	0	63	15	0
400	80	0	0	80	13	4	83	6	8	85	0	0
500	100	0	0	102	1	8	104	3	4	106	5	0
600	120	0	0	122	10	0	125	0	0	127	10	0
700	140	0	0	141	18	4	145	16	8	148	15	0
800	160	0	0	161	6	8	167	13	4	170	0	0
900	180	0	0	182	15	0	187	10	0	191	5	0
1000	200	0	0	204	3	4	208	6	8	212	10	0
2000	400	0	0	408	6	8	416	13	4	425	0	0
3000	600	0	0	612	10	0	625	0	0	637	10	0

N° of Pieces	52 d. ℔	53 d. ℔	54 d. ℔	55 d. ℔
1	l. 0 4 4	0 4 5	0 4 6	0 4 7
2	0 8 8	0 8 10	0 9 0	0 9 2
3	0 13 0	0 13 3	0 13 6	0 13 9
4	0 17 4	0 17 8	0 18 0	0 18 4
5	1 1 8	1 2 1	1 2 6	1 2 11
6	1 6 0	1 6 6	1 7 0	1 7 6
7	1 11 4	1 10 11	1 11 6	1 12 1
8	1 14 8	1 15 4	1 16 0	1 16 8
9	1 19 0	1 19 9	2 0 6	2 1 3
10	2 3 4	2 4 2	2 5 0	2 5 10
20	4 6 8	4 8 4	4 10 0	4 11 8
30	6 10 0	6 12 6	6 15 0	6 17 6
40	8 13 4	8 16 8	9 0 0	9 3 4
50	10 16 8	11 0 10	11 5 0	11 9 2
60	13 0 0	13 5 0	13 10 0	13 5 0
70	15 3 4	15 9 2	15 15 0	16 1 10
80	17 6 8	17 13 4	18 0 0	18 6 8
90	19 10 0	19 17 6	20 5 0	20 12 6
100	21 13 4	22 1 8	22 10 0	22 18 4
200	43 6 8	44 3 4	45 0 0	45 16 8
300	65 0 0	66 5 0	67 10 0	68 15 0
400	86 13 4	88 6 8	90 0 0	91 13 4
500	108 6 8	110 8 4	112 10 0	114 11 8
600	130 0 0	132 10 0	135 0 0	13 10 0
700	151 13 4	154 11 8	157 10 0	160 8 4
800	173 6 8	176 13 4	180 0 0	183 6 8
900	195 0 0	198 15 0	202 10 0	206 5 0
1000	216 13 4	220 16 8	225 0 0	229 3 4
2000	433 6 8	441 13 4	450 0 0	458 6 8
3000	650 0 0	662 10 0	675 0 0	687 10 0

N°

N° of Pieces	56 d. ℔			57 d. ℔			58 d. ℔			59 d. ℔			60 d. ℔		
1	l.	0	4 8	0	4	9	0	4	10	0	4	11	0	5	0
2		0	9 4	0	9	6	0	9	8	0	9	10	0	10	0
3		0	14 0	0	14	3	0	14	6	0	14	9	0	15	0
4		0	18 8	0	19	0	0	19	4	0	19	8	1	0	0
5		1	3 4	1	3	9	1	4	2	1	4	7	1	5	0
6		1	8 0	1	8	6	1	9	0	1	9	6	1	10	0
7		1	12 8	1	13	3	1	13	10	1	14	5	1	15	0
8		1	17 4	1	18	0	1	18	8	1	19	4	2	0	0
9		2	2 0	2	2	9	2	3	6	2	4	3	2	5	0
10		2	6 8	2	7	6	2	8	4	2	9	2	2	10	0
20		4	13 4	4	15	0	4	16	8	4	18	4	5	0	0
30		7	0 0	7	2	6	7	5	0	7	7	6	7	10	0
40		9	6 8	9	10	0	9	13	4	9	16	8	10	0	0
50		11	13 4	11	17	6	12	1	8	12	5	10	12	10	0
60		14	0 0	14	5	0	14	10	0	14	15	0	15	0	0
70		16	6 8	16	12	6	16	18	4	17	4	2	17	10	0
80		18	13 4	19	0	0	19	6	8	19	13	4	20	0	0
90		21	0 0	21	7	6	21	15	0	22	2	6	22	5	0
100		23	6 8	23	15	0	24	3	4	24	11	8	25	0	0
200		46	13 4	47	10	0	48	6	8	49	3	4	50	0	0
300		70	0 0	71	5	0	72	10	0	73	15	0	75	0	0
400		93	6 8	95	0	0	96	13	4	98	6	8	100	0	0
500		116	13 4	118	15	0	120	16	8	122	18	4	125	0	0
600		140	0 0	142	10	0	145	0	0	147	10	0	150	0	0
700		163	6 8	166	5	0	169	3	4	172	1	8	175	0	0
800	l.	186	13 4	190	0	0	193	6	8	196	13	4	200	0	0
900		210	0 0	213	15	0	217	10	0	221	5	0	225	0	0
1000		233	6 8	237	10	0	241	13	4	245	16	8	250	0	0
2000		466	13 4	475	0	0	483	6	8	491	13	4	500	0	0
3000		700	0 0	712	10	0	725	0	0	737	10	0	750	0	0

ENGLAND *with* SPAIN.

SPAIN gives to *England* the Piaſtre or Piece of Eight, from between 55 *d.* to 60 *d.* Sterling.

In *Madrid*, *Seville*, and ſeveral other Places, they keep their Accompts in Pieces of Eight, of Piaſtres, Rails, and Mervades: The Par of which with *England* is 4 *s.* 6 *d.* ℔ Piece of Eight.

Note, 372 Mervades is one Rail, 8 Rails is one Piece of Eight of 4 *s.* 6 *d.* ℔, Value in *England*.

Spain remits to *England* 2364 Piaſtres, at 4 *s.* 6 *d.* ℔, Sterling; How many Pounds Sterling muſt they receive for this Bill?

	P.	*s.*	*d.*	*Piaſtres.*
If	1	4	6	2364
				54
				9456
				11820
				127656
				10638
				L. 531 18 0 Anſwer.

By the TABLE *foregoing.*

		l.	*s.*	*d.*
2000	Piaſtres, at 54 *d.* ℔	450	00	0
300		67	10	0
60		13	10	0
4		0	18	0
Anſwer as before,		*L.* 531	18	0

London draws upon *Madrid* for the Value of 720 *l.* 13 *s.* 4 *d.* The Exchange at 54 *d.* Sterling ℔ Piece of Eight: What muſt be paid at *Madrid* for this Remittance?

d.	*P.*	*d.*
If 54	1	172960

1

Pieces. R. Mervades.

54 | 172960 | 3202 7 261 $\frac{4}{34}$ Anſwer.

162

109
108

160
108

52
8

54 | 416 | 7 Rails.

378

38
372

2976
1116

54 | 14136 | 261 Mervades.

108

333
324

96
54

42

l.	*s.*	*d.*
720	13	4

20

14413
12

172960

Seville remits to *London* a Bill of Exchange, Value 3202 Piaſtres, 7 Rails, 261 Mervades $\frac{42}{54}$: The Exchange at 54 *d.* Sterling ℔ Piaſtre; What muſt be drawn at *London* for this Bill?

Piaſtre.		*Piaſt.*	*Ra.*	*Mervades.*
1		3202	7	261 $\frac{42}{54}$
8		8		
8		25623		
372		372		
2976 Mervades.		51247		
		179367		
		76871		
	Merv. *d.*	9532017		
If	2976 54	54		
		38128070		
		47660089		

2976 | 514728960 | 12 | 172960

2976 | 2|0| 1441 |3 4 *d.*

21712 *l.* 720 13 4 Anſ.

20832

8808

5952

28569

26784

17856

17856

00

GERMANY MONEY.

THE Rix Dollar of 3 Marks, the Dollar of 2 Marks, and the Mark of 16 Stiver Lubs; The Shilling Groſs of 5 Lubs, the Stiver of 2 Groſs or 12 Deniers, and the Groſs or Deniers of 16 Denier Lubs.

The Term *Lubs* comes from a City called *Lubick* in *Holſtein* in *Germany*, where the Stiver, Lubs, and Penny's are coined. Some keep their Accompts in Rix Dollars, Stivers and Deniers, and ſome in Marks, Stivers, and Denier Lubs.

England Draws upon *Germany* for the Value of 354*l.* 3*s.* 8*d.* The Exchange at 32*s.* 4*d. per* Groſs for 20 *s.* Sterling: What muſt be paid for this Draught?

32 *s.* 4 *d.*
12
388 Pence.

20 *s.*
12
240 Pence.

354 *l.* 3 *s.* 8 *d*
20
7083
12
85004 Pence.

d. *d.* *d.*
If 240 388 85004
388
680032
680032
255012

12 | 2|0 | *l.* *s.* *d.*
24|0 | 3298155|2 | 137423 | 11451 | 572 11 11 $\frac{3\,1}{2\,4\,0}$
24 | 12 | 10 | Anſwer.
89 | 17 | 14
72 | 12 | 14
178 | 54 | 5
168 | 48 | 4
101 | 62 | 11
96 | 60
55 | 23
48 | 12
75 | 11
12
32

Hamburgh remits to *London* a Bill of Exchange, Value 572 *l.* 11 *s.* 11 *d.* $\frac{31}{240}$ Groſs; The Exchange at 32 *s.* 4 *d.* Groſs for 20 *s.* Sterling: What Sterling Money muſt be drawn at *London* for this Bill?

d. *d.* *d.*

If 388 240 137423 $\frac{31}{240}$

240

5496952

274846

12

388 | 32981552 | 85004

3104 708|3 8

1941 *l.* 354 3 8 Anſwer

1940

1552

1552

00

England *with* Venice.

ENGLAND to *Venice* 52 Pence to 69 Pence Sterling, for one Ducat de Banco, of 24 Groſs.

England gives to *Florence* from 49 Pence to 83 Pence Sterling, for one Crown, of 7 $\frac{1}{2}$ Livres ℔.

England

England remits to *Venice* a Bill of Exchange, the Value of 720 *l.* Sterling; The Exchange at 60 *d.* Sterling ℔ Ducat de Banco; What must be paid at *Venice* for this Bill?

	d.	*Duc.*	*l.*
If	60	1	720
			20

I multiplied the Quotient by 12, instead of bringing it into Pence.

60 | 1440 | 0 | 240
12 | 12
24 | 2880 Answer.
24
0

Or thus.

	d.	*Duc.*	*l.*
If	60	1	720
			4 Crowns is one Pound.
			2880 Answer, as before.

London draws upon *Venice* for the Value of 490 *l.* 16 *s.* 5 *d.* Sterling; The Exchange at 58 *d.* Sterling ℔ Ducat de Banco; What must be paid at *Venice* for this Draught?

d.	*Duc.*	*d.*		*l.*	*s.*	*d.*
If 58	1	117797		490	16	5
		1			20	
			Ducats de Banco.			
58	117797	2030 $\frac{57}{58}$		9816		
	116	Answer.			12	
	179			117797		
	174					
	57					

By the foregoing TABLE *proved.*

	l.	*s.*	*d.*
2000 Ducats de Banco, at 58 *d.* ℔	483	6	8
30 Ditto, - - - at ditto,	7	5	0
Remains, 57 Pence, equal to		4	9
Proof, *L.*	490	16	5

Venice

Venice draws upon *Cheſter* for the Value of 2884 Duccatoons; The Exchange at 60 *d.* ℔ Duccatoon; What muſt be paid at *Cheſter* for this Bill?

Duc. *d.* *Duccatoons.*
If 1 60 2884
60

12 | 173040

2|0 | 1442|0

L. 721 00 00 Anſwer.

Cheſter remits to *Venice* a Bill of Exchange, Value 721 *l.* to receive the ſame in Duccatoons, at 60*d.* ℔; How many muſt the Bill be drawn for?

d. *Duc.* *d.*
If 60 1 173040
1

Duccatoons.
60 | 173040 | 2884 Anſwer.
120

530
480

504
480

240
240

0

Amſterdam,

	s.	d.			s.	d.	
Amsterdam,	31	6	*Flemish*, for		33	4	*Flemish.*
Rotterdam,	31	8	1 *l.* Ster. Par,		33	4	*Flem.*
Antwerp,	31	5			33	4	*Flem.*
Hamburgh,	30	4	for 1 *l.* Ster. of		32	0	*Flem.*

	d.		
Madrid,	56 ½	for 1 Piece of 8 *Mexico*, at 54 *d.* ¼	Sterling.
Calais,	56 ½		
Genoa,	62 ½		
Leghorn,	62 ½		

Venice,	59 ½	Ster. for 1	Ducat of 52 *d.* Sterling
Paris,	51		Crown *Fren.* 54 *d.* St.
Lisbon,	6 *s.* 6 *d.*		Millrea of 6 *s.* 8 *d.* ½ St.
Oporto,	6 5		Millrea 6 *s.* 8 *d.* ½ Ster.

Note, That Bills are usually drawn to and from *Dublin* to *London*, payable in 21 Days; and the Exchange sometimes 4, 5, 6, 7, 8, 9, 10, &c. Pounds *per Cent.* allowed for Return. The Table above needs no Explanation, save this, That the Course of Exchange to *Amsterdam* is 31 *s.* 6 *d.* *Flemish* for one Pound Sterling, which is 1 *s.* 10 *d.* *Flemish* *per* Pound loss to us, it being so much under the Par, or 33 *s.* 4 *d.* and so of the rest.

THE

The Rules of PRACTICE.

THE *Rules of* PRACTICE are ſo called, from their frequent Uſe and Brevity in being very expeditious in caſting up moſt Sorts of Goods in Merchandiſe.

N. B. That any Queſtion in the *Rule of Three*, when the firſt Number in ſtating is a Unit, will be the ſooneſt work'd by theſe Rules called *Practice*: But previous to theſe Rules, it is neceſſary to have the following TABLES perfectly by Heart.

THE
Even Parts of a Shilling.

For	d.	take
	10	5/6
	9	3/4
	8	3/3 1/2
	6	1/2
	4	1/3
	3	1/4
	2	1/6
	1 1/2	1/8
	1	1/12
	1 1/4	1/10
	1 1/6	1/24
	1	1/25

THE
Even Parts of a Pound.

For	s.	d.	take
	17	6	1/8
	16	0	4/5 3/4 2/3 1/2 2/5 1/4
	15	0	3/4 2/3 1/2 2/5 1/4
	13	4	2/3 1/2 2/5 1/4
	12	6	1/2 2/5 1/4
	10	0	2/5 1/4
	7	6	1/4
	6	8	1/3 1/4
	5	0	1/4
	4	0	1/5
	3	4	1/6
	2	6	1/8
	1	8	1/12
	1	0	1/20

4 | 720 Sheets of Cap Paper, at $\frac{1}{4}$ *per.*

12 | 180 *Note*, $\frac{1}{4}$ is $\frac{1}{4}$ of $\frac{1}{12}$ of $\frac{1}{20}$ of a Pound.

S. 15 Anſwer.

2 | 720 Sheets of Writing-Paper, at $\frac{1}{2}$ *per.*

12 | 360

2|0 | 3|0

L. 1 10 Anſwer.

16 | 720 Pounds of Salt, at $\frac{1}{4}$ *per.*

2|0 | 4|5

L. 2 5 Anſwer.

12 | 720 Yards of Tape, at 1 *d.* *per.*

2|0 | 6|0

L. 3 0 0 Anſwer.

1 *d.* 12 | 720 Yards of Ferreting, at 1 *d.* $\frac{1}{4}$ *per.*

$\frac{1}{4}$ $\frac{1}{4}$ | 60

15

2|0 | 75

L. 3 15 0 Anſwer.

$\frac{1}{2}$ | 1347

$\frac{1}{6}$ | 1347 Pounds of Treacle, at 1 *d.* $\frac{1}{2}$ ℔.

2|0|168 $\frac{3}{8}$ = 4 *d.* $\frac{1}{2}$

L. 8 8 4 $\frac{1}{2}$ Anſwer.

$\frac{1}{6}$ | 296 Ounces of Gum Arabick, at 2 *d.* ℔.

2|0 | 4|9 $\frac{2}{6}$ = 4 *d.*

L. 2 9 4 Anſwer.

2 *d.* $\frac{1}{6}$ | 269 Pounds of Pork, at 2 *d.* $\frac{1}{2}$ $\frac{1}{8}$ ℔.

$\frac{1}{2}$ $\frac{1}{4}$ | 44 $\frac{5}{6}$ = 10 *d.*
$\frac{1}{8}$ $\frac{1}{4}$ | 11 2 $\frac{1}{2}$
2 9 $\frac{1}{2}$ $\frac{1}{8}$ remains.

Note, I took $\frac{1}{6}$ for 2*d.* and $\frac{1}{4}$ of that for a Farthing, and $\frac{1}{4}$ of that for the half Farthing.

2|0| 5|8 : 10 $\frac{1}{8}$

L. 2 18 10 $\frac{1}{8}$ Anſwer.

3 *d.* $\frac{1}{4}$ | 1364 Pounds of Sugar, at 3 *d.* ℔.

2|0 | 34|1

L. 17 1 0 Anſwer.

3 *d.* $\frac{1}{4}$ | 7284 Pounds of Butter, at 3 *d.* $\frac{1}{4}$ ℔.

$\frac{3}{4}$ $\frac{1}{4}$ | 1821
455 3 *d.*
227|6 3

L. 113 16 3 Anſwer.

4*d*. $\frac{1}{3}$ | 244 Ounces of Gum Sandrick, at 4*d*. ℔.
2|0 | 8|1 $\frac{1}{3}$ = 4 *d*.
L. 4 1 4 Anſwer.

4*d*. $\frac{1}{3}$ | 246 Pounds of Raiſins, at 4 *d*. $\frac{1}{4}$ ℔.
$\frac{1}{8}$ | 82
10 3 *d*.
2|0 | 9|2 3
L. 4 12 3 Anſwer.

4*d*. $\frac{1}{3}$ | 298 Yards of Ribband, at 5 *d*. $\frac{1}{4}$ ℔.
1 $\frac{1}{2}$ $\frac{1}{8}$ | 99 $\frac{1}{3}$ = 4 *d*.
$\frac{1}{2}$ $\frac{1}{6}$ | 37 $\frac{2}{8}$ = 3
6 2 $\frac{1}{2}$
2|0 | 14|2 9 $\frac{1}{2}$
L. 7 2 9 $\frac{1}{2}$ Anſwer.

I took $\frac{1}{3}$ for 4*d*. and $\frac{1}{8}$ for 1 *d*. $\frac{1}{2}$ out of the Given Number, and $\frac{1}{6}$ of the 1*d* $\frac{1}{2}$ Line for $\frac{1}{4}$, and added them together, &c.

6*d*. $\frac{1}{2}$ | 327 Pounds of Sugar, at 6 *d*. ℔.
2|0 | 16|3 $\frac{1}{2}$ = 6
L. 8 3 6 Anſwer.

6*d*. $\frac{1}{2}$ | 496 Yards of Canvas, at 6 *d*. $\frac{1}{4}$ ℔.
$\frac{1}{4}$ $\frac{1}{8}$ | 248
31
2|0 | 27|9
L. 13 19 0 Anſwer.

6 *d.* $\frac{1}{2}$ | 748 Yards of Barragun Jeans, at 7*d.* $\frac{3}{4}$ *Yd.*

1 $\frac{1}{2}$ $\frac{1}{8}$ | 374

$\frac{1}{4}$ $\frac{1}{6}$ | 93 $\frac{4}{8}$ = 6*d.*

15 7

2|0 | 48|3 1

L. 24 3 1 Anſwer.

I took $\frac{1}{2}$ for 6 *d.* and $\frac{1}{8}$ for 1 $\frac{1}{2}$ of the given N°, and $\frac{1}{6}$ of the 1 $\frac{1}{2}$ Line for $\frac{1}{4}$, and added them together, &c.

436 Yards of Jeans, at 8*d.* *Yd.*

2

3 | 872

2|0 | 29|0 $\frac{2}{3}$ = 8 *d.*

L. 14 10 8. Anſwer.

364 Yards of White Plain, at 9*d.* *Yd.*

3

4 | 1092

2|0 | 27|3

L. 13 13 0 Anſwer.

236 Yards of Lin, at 9 *d.* $\frac{3}{4}$ $\frac{1}{8}$ *Yd.*

3

4 | 708

$\frac{1}{1\frac{1}{2}}$ | 177

$\frac{1}{8}$ | 14 $\frac{9}{12}$ 9 *d.*

2 5 $\frac{1}{2}$

2|0 | 19|4 2 $\frac{1}{2}$

L. 9 14 2 $\frac{1}{2}$ Anſwer.

I took $\frac{1}{1\frac{1}{2}}$ of the 9 *d.* Line for $\frac{3}{4}$, and $\frac{1}{8}$ of the $\frac{3}{4}$ Line for $\frac{1}{8}$, and added them together, &c.

428 Yards of Lin-Cloth, at 10 *d.* ℔.

5

6 | 2140

2|0 | 35|6 $\frac{4}{6}$ 8

L. 17 16 8

Or thus, which I think is much better; Add a Cypher to the given N°, and Divide by 12 and by 20, and you have the Anſwer.

12|4280

2|0 | 35|6 8

L. 17 16 8 as before.

348 Yards of Cheque, at 11 *d.* ℔

348

12 | 3828

2|0 | 31|9

L. 15 19 0 Anſwer.

I ſet the given N° thus, inſtead of Multiplying by 11, &c.

2448 Yards of Shalloon, at 11*d.* $\frac{3}{4}$ $\frac{1}{6}$ ℔.

2448

11 *d.*	26928
$\frac{1}{2}$ $\frac{1}{2}$	1224
$\frac{1}{4}$ $\frac{1}{2}$	612
$\frac{1}{6}$ $\frac{1}{2}$	306

12 | 29070

2|0 | 242|2 6

L. 121 2 6 Anſwer.

I took $\frac{1}{2}$ of the given N° for $\frac{1}{2}$, and $\frac{1}{2}$ of that for $\frac{1}{4}$, and $\frac{1}{2}$ of that for $\frac{1}{6}$, and added all together, &c.

The

The Even Parts of a Pound Sterling.

2|0| 14|4 Yards of Grogram, at 1 Shilling ℔.

L. 7 4 Anſwer.

3*d*. $\frac{1}{4}$ | 144 Yards of Lin-Cloth, at 1 *s*. 3 *d*. ℔.
36

2|0| 18|0

L. 9 0 0 Anſwer.

$\frac{1}{12}$ | 248 Yards of Plain, at 1 *s*. 8 *d*. ℔.

L. 20 $\frac{8}{12}$ = 13 4. Anſwer.

365 Yards of Thick Sets, at 1 *s*. 9 *d*. ℔.

for 9*d*. add 273 9

2|0| 63|8 9

L. 31 18 9 Anſw.

365
3 6 5
3

4|1095 *d*.

S. 273 9

236 Gallons of Cyder, at 2 *s*. ℔.

L. 23 12 0 Anſw. } Here I double the laſt Figure for Shillings, the reſt are Pounds.

428 Yards of Kerſey, at 2 *s*. ℔.

L. 42 16 0 Anſwer.

364 Yards of Kerſey, at 2 *s.* 4 *d.* ℔.

4 *d.* is $\frac{1}{6}$ 36 8
6 1 4

L. 42 9 4 Anſwer.

$\frac{1}{8}$ | 1428 Yards of Scotch Plaid, at 2 *s.* 6 *d.* ℔.

L. 178 $\frac{4}{8}$ = 10 0 Anſwer.

429 Yards of Plain, at 3 *s.* ℔.

1 *s.* take $\frac{1}{2}$ 42 18
21 9

L. 64 7 0 Anſwer.

$\frac{1}{8}$ | 694 Gallons of Brandy, at 3 *s.* 4 *d.* ℔.

L. 115 $\frac{4}{8}$ = 13 4 Anſwer.

758 Gallons of Ditto, at 4 *s.* ℔.

2

L. 151 12 0 Anſwer. } Say, 2 Times 8 is 16, the Double of 16 is 32, ſet down 12 *s.* and carry 1 to the Pounds.

Obſerve, If your N° of Shillings be even as here, multiply your N° given, by half the N° of Shillings, the Firſt Figure to the Right Hand, in your Product is a double N° of Shillings; and in your Opperation ought to be ſet a-part in the Place of Shillings; the Reſt are Pounds.

736

736 Gallons of Annel-Seed-Waters, at
2 [4 *s.* 8 *d.* ℔.

$\frac{1}{8}$ | 147 4 I take $\frac{1}{8}$ of the 4 *s.* Line for
24 10 8 8 *d.* and add them together.

L. 171 14 8 Anſwer.

$\frac{1}{4}$ | 736 Gallons of Ditto, at 5 *s.* ℔.

L. 184 Anſwer.

$\frac{1}{3}$ | 724 Sheep, at 6 *s.* 8 *d.* ℔.

L. 241 $\frac{1}{3}$ = 6 8 Anſwer.

724 Ditto, at 7 *s.* 6 *d.* ℔
3

8 | 2172

L. 271 $\frac{4}{8}$ = 10 *s.* 0 *d.*

324 Gallons of Jamaica Rum, at 8 *s.* ℔.
4

L. 129 12 0 Anſwer.

324 Gallons of Ditto, at 9 *s.* 8 *d.* ℔.
4

129 12 For 1 *s.* 8 *d.* I took $\frac{1}{12}$ of
1 *s.* 8 *d.* $\frac{1}{12}$ 27 0 the given N°.

L. 156 12 0 Anſwer.

½ | 942 Gallons of Canary, at 10 *s.* ℔.

L. 471 Anſwer.

486 Yards of *Devonſhire* Plain, at 12*s.* 6*d.*

5

8 | 2430

L. 303 $\frac{6}{8}$=15 0 Anſwer.

842 Windles of Wheat, at 13 *s.* 4 *d.* ℔.

2

3 | 1684

L. 561 $\frac{1}{3}$=6 8 Anſwer.

726 Yards of Broad Cloth, at 14 *s.* ℔.

7

L. 508 4 0 Anſwer.

726 Yards of Ditto, at 15 *s.* ℔.

3

4 | 2178

L. 544 $\frac{1}{4}$=10 0 Anſwer.

832 Yards of Ditto, at 16 *s.* ℔.

8

L. 665 12 0 Anſwer.

725 Yards of Ditto, at 17 *s.* 6 *d.* ℔.

7

8 | 5075

L. 634 $\frac{3}{8}$=7 *s.* 6 *d.* Anſwer.

120 Loads of Meal, at 18 *l.* *ℳ*.

9

L. 108 0 0 Anſwer.

144 Loads of Ditto, at 19 *s.* 8 *d.* *ℳ*.

9

$\frac{1}{12}$ | 129 12

12 00

L. 141 12 0 Anſwer.

10 *s.* $\frac{1}{2}$ | 744 Loads of Meal, at 19 *s.* 11 *d.* $\frac{3}{4}$ *ℳ*.

			s.	*d.*
4	$\frac{1}{5}$	372		
5	$\frac{1}{4}$	148 $\frac{4}{5}$	= 16	0
		186		
0 6 *d.*	$\frac{1}{4}$ 0	18 $\frac{3}{4}$ 0	= 12	0
4	$\frac{1}{5}$ 0	12 $\frac{3}{5}$	= 8	0
1	$\frac{1}{4}$	3	2	0
$\frac{1}{2}$	$\frac{1}{8}$	1	11	0
$\frac{1}{4}$	$\frac{1}{2}$		1 5	6

L. 743 : 4 6 Anſw.

Or thus,

4 | 744

12 | 186

15 *s.* 6 *d.*

l. 744 given N°

15 6 ſubt.

743 4 6

Obſerve, this Quere but wants $\frac{1}{4}$ of one Pound, ſo the latter Way I found what 744 Farthings would amount to, which I find to be 15 *s.* 6 *d.* So I ſubtract that from the given N°, which I call Pounds, and the Difference is the Anſwer, as before.

246 Hundred, at 2 *l.* 17 *s.* 6 *d.* ℔.

2	246
492	7
215 5 for 17 *s.* 6 *d.*	8 | 1722
L. 707 5 0 Anſwer.	L. 215 5

111 Packs of Cotton, at 11 *l.* 11 *s.* 11 *d.* ℔.

111	
11 *s.* $\frac{1}{10}$	1221
11 *d.* $\frac{1}{12}$	61 1 0
	5 1 9
L. 1287 2 9 Anſwer.	

If the Price of one be given, and the Price of any other N° be required, together with $\frac{1}{4}$ $\frac{1}{2}$ $\frac{3}{4}$, or any other Part, you muſt work as before for the Integral Part, and for the Fractional Part take ſuch Part of the given Price: The Total Sum of which Parts will be the Anſwer to the Queſtion, as under may appear.

C. qr. lb.	*l. s. d.*
126 3 14	at 8 12 6 ℔ Hundred.
8	
1008	
78 15 0	for 12 *s.* 6 *d.*
6 9 4 $\frac{1}{2}$	for $\frac{3}{4}$ of a Hundred.
1 1 6 $\frac{3}{4}$	for 14 Pound Weight.
L. 1094 5 11 $\frac{1}{4}$ Anſwer.	

But the *Rule of Three* is beſt for this.

Numeration

Numeration *of* Vulgar Fractions.

A FRACTION or Broken Number is that which repreſents a Part or Parts of any Thing propoſed, and is expreſſed by two Numbers placed one above the other, with a Line drawn betwixt them, Thus, $\frac{3}{4}$ 3 Numerator. 4 Denominator.

The Denominator or Number placed underneath the Line, denotes how many equal Parts the Thing is ſuppoſed to be Divided into (being only the Diviſor in Diviſion;) and the Numerator or Number placed above the Line, ſhews how many of thoſe Parts are contained in the *Fraction*, (it being the Remainder after the Diviſion is ended) and theſe admit of three Diſtinctions,

viz. { Proper or Simple, Improper, Compound, } Fractions.

A Proper, Pure, or Simple Fraction, is that which is leſs than an Unit; That is, it repreſents the immediate Part or Parts of any Thing leſs than the Whole; and therefore its Numerator is always leſs than the Denominator.

And, $\frac{1}{4}$ is one Fourth Part.
$\frac{1}{2}$ is one Half.
$\frac{3}{4}$ is three Fourths or 3 Quarters.
$\frac{2}{3}$ is two Thirds.
$\frac{4}{5}$ is four Fifths.

An

An Improper Fraction is that which is greater than an Unit: That is, it repreſents ſome Number of Parts greater than the whole Thing. And its Numerator is always greater than the Denominator.

As $\frac{3}{2}$ or $\frac{5}{3}$ or $\frac{8}{7}$ or $\frac{9}{1}$

A Compound Fraction is a Part of a Part, conſiſting of ſeveral Numerators and Denominators connected together with the Word *of*.

As $\frac{2}{3}$ of $\frac{3}{4}$ of $\frac{7}{8}$, *&c.* And are thus read; Two Thirds of three Fourths of ſeven Eighths of an Unit.

That is, When a Unit (or whole Thing) is firſt Divided into any Number of equal Parts, and each of thoſe Parts are ſubdivided into other Parts, and ſo on. Then thoſe laſt Parts are called Compound Fractions, or Fractions of Fractions.

As for Inſtance, Suppoſe a Pound Sterling (or 20 Shillings) be the Unit or Whole, then is 17 *s.* 6 *d.* the $\frac{7}{8}$ of it, and $\frac{3}{4}$ of that is 13 *s.* 1 *d.* $\frac{1}{2}$, and $\frac{2}{3}$ of that is 8 *s.* 9 *d.* equals $\frac{2}{3}$ of $\frac{3}{4}$ of $\frac{7}{8}$ of a Pound Sterling; which 8 *s.* 9 *d.* is the Anſwer.

Reduction of *Vulgar Fractions.*

REDUCTION of VULGAR FRACTIONS muſt be taught before *Addition* and *Subtraction*, for without the Knowledge of *Reduction* firſt, *Addition* and *Subtraction* cannot be underſtood nor performed.

By *Reduction* we bring *Fractions* into their leaſt equivalent Parts.

And

And into common Denominators, or into one Denomination.

By *Reduction* we find the Value of any *Fraction* in the known Parts of an Integer. Reduce whole or mix'd Numbers into Improper *Fractions*, and the Contrary. As likewise Compound *Fractions* into Single. Of these in their Order.

1. To bring *Fractions* into their least equivalent Parts may be performed several Ways. A general Rule for which is either of these that follow:

First, Divide the Denominator by the Numerator, and the Divisor by the Remainder, if any be; thus doing till you find nothing to remain: Your last Divisor is the greatest Common Measure sought; or Divide the Denominator by the Numerator, and likewise by the Remainder, as long as there is any; the last Divisor is your greatest Common Measure sought, as before.

By which dividing, your Numerator and Denominator reduceth your given *Fractions* into its least Parts.

Note, If your last Divisor be an Unit, the Fraction is in its least Terms at first; so Dividing will bring it no nearer than it was at first.

What's the greatest common Measure of 72 and 108.

72	108	1
	72	
36	72	2
	72	

Therefore $\left\{\begin{matrix}36\\36\end{matrix}\right\}$ $\left\{\begin{matrix}72\\108\end{matrix}\right|\left.\begin{matrix}2\\3\end{matrix}\right.$ Hence $\frac{72}{108}$ is abreviated to $\frac{2}{3}$ the lowest Terms.

But

But *Fractions* may more quickly be abreviated if you can descry any N° that will evenly divide both your Numbers, without leaving any Remainder, as this might have been done by Dividing by 12, which would have brought them to $\frac{6}{9}$, equal to $\frac{2}{3}$, as above; or by having both Numbers as long as possible, and by Dividing by any Number that will leave no Remainder. Thus,

$\frac{2}{2}$ | 72 | 36 | 9 | 18 | 2
108 | 54 | 27 | 3 as before.

Bring me $\frac{84}{96}$ into its lowest Terms.

$\frac{2}{2}$ $\frac{2}{2}$ 3
84 | 42 | 21 | 7
96 | 48 | 24 | 8 in its lowest Terms,

Bring me $\frac{108}{864}$ into its lowest Terms.

$\frac{2}{2}$ $\frac{9}{9}$ $\frac{3}{3}$
108 | 54 | 27 | 3 | 1
864 | 432 | 216 | 24 | 8

So this *Fraction* in its lowest Terms is equal to $\frac{1}{8}$ Part of the whole Thing or Integer: And so of any other.

2. When several *Fractions* are given to be reduced into other Equivalent Fractions, having a common Denominator, USE THIS RULE;

Multiply every Numerator into each Denominator continually, except its own, which shall be a new Numerator: Then Multiply all the Denominators into one another for a common Denominator, and the Work is finished.

Let

Let $\frac{1}{2}$ and $\frac{2}{3}$ and $\frac{3}{4}$ and $\frac{5}{6}$ be reduced into other Fractions, which shall have one common Denominator.

2	3	2	3	5
3	1	2	2	2
6	3	4	6	10
4	4	4	3	3
24	12	16	18	30
6	6	6	6	4
144 Com. De.	72	96	108	120
	$144\text{-}\frac{1}{2}$	$144\text{-}\frac{2}{3}$	$144\text{-}\frac{3}{4}$	$144\text{-}\frac{5}{6}$

Hence 144 is the Common Denominator, and 72, 96, 108, 120, are the New Numerators, which being placed Fraction-wise, are the New Fractions required; That is, $\frac{72}{144}=\frac{1}{2}$, $\frac{96}{144}=\frac{2}{3}$, $\frac{108}{144}=\frac{3}{4}$, and $\frac{120}{144}=\frac{5}{6}$.

To bring Mix'd Numbers into Fractions, and the Contrary.

Mix'd Numbers are brought into Improper Fractions by this RULE.

Multiply the Integers or whole Numbers with the Denominator of the given Fraction, and to their Product add the Numerator, the Sum will be the Numerator of the Fraction required.

Let $9\frac{4}{5}$ be brought into an improper Fraction.

Thus, $9\frac{4}{5}$

5

49 The Fraction required.

5

Let $9\frac{6}{7}$ be brought to an improper Fraction.

7

69 The Answer required

7

To find the true Value of any improper Fraction given, is only the Converſe of this Rule; for if $^{4}\frac{9}{5} = 9\frac{4}{5}$, as before is evident. Then it follows, that 49 be divided by 5, the Quotient will be 9, and 4 will remain; which is thus expreſſed $9\frac{4}{5}$; and if 69 be divided by 7, the Anſwer will be $9\frac{6}{7}$.

Fractions of diverſe Denominations may be brought into one Denomination, by involving the Leſs into the Parts of the Greater, whereby it will become a Compound Fraction.

So if $\frac{3}{4}$ of a Shilling, and $\frac{4}{7}$ of a Pound, muſt be brought into the Fraction of a Pound, you may obſerve that $\frac{3}{4}$ of a Shilling is $\frac{3}{4}$ of $\frac{1}{20}$ of a Pound, becauſe one Shilling is one Twentieth of a Pound; which Compound Fraction, when reduced by one of the following Rules, will be $\frac{3}{80}$ of a Pound: So you have both in one Denomination, as was required.

So $\frac{3}{7}$ of an Ounce, reduced into the Fraction of a Hundred Weight, will be $\frac{3}{7}$ of $\frac{1}{28}$ of $\frac{1}{4}$ of a Hundred Weight, equal to $\frac{3}{784}$; and ſo of any other.

To find the Value of any *Vulgar Fraction* in the known Parts of the Integer, do thus;

Multiply the Numerator of the Fraction given by the known Parts of the next inferior Denomination; which Product, divided by the Denominator, quotes the Parts of that Denomination ſought; the Remainder, if any, multiplied by the Parts of the next inferior Denomination, and divided as before, gives the Parts of the next Denomination; and thus muſt you do till you have

it

it brought into the least known Parts, or, till Nothing remains.

What's the Value of $\frac{7}{8}$ of a Pound Sterling?

7 Numerator.

20

Denominator, 8 | 140 | 17 *s.* 6 *d.* the Answer.

8

60

56

4

12

Denominator, 8 | 48 | 6

48

0

What's the Value of $\frac{56}{84}$ of a Ton Weight, or a Ton being the Integer? 56 Numerator.

20

84 | 1120 | 13 Hundred.

84

280

252

28

4

84 | 112 | 1 Quarter.

84

28

28

224

56

84 | 784 | 9 Pounds.

756

28

16

168

28

84 | 448 | 5 Ounces.

420

28

After

After the ſame Way the Value of any Weight and Meaſure, or any Thing of whatever Denomination (taking Heed to the Rule before-going) are found.

To reduce whole or mixt Numbers into improper Fractions, do thus;

If your Number given be an Integer, it is but making an Unit Denominator thereunto: So 8 reduced into an improper Fraction will be $\frac{8}{1}$, and 3 will be $\frac{3}{1}$.

If your Denominator be fixed, the Product of it, and your Integer given, will be the Numerator.

So if 8 were given to be reduced into an improper Fraction, whoſe Denominator ſhould be 12, the improper Fraction anſwering would be $\frac{96}{12}$, and ſo of any other.

But if it be a mixt Number, then multiply the Integral Part of your mixt Number by the Denominator of your Fractional Part, and to the Product add the Numerator of the ſaid Fractional Part, the Sum will be the Numerator to the former Denominator.

So $3\frac{3}{5}$ will be $\frac{18}{5}$, and $3\frac{7}{12}$ will be $\frac{43}{12}$.

On the Contrary, if you would reduce any Improper Fraction into its Equivalent, whole, or mixt Number, do thus;

Divide your Numerator by the Denominator, the Quotient is the whole or Integral Part; and the Remainder, if any, is Numerator to the former Denominator.

So, if $\frac{45}{15}$ were reduced, it would be a whole Number, *viz.* 3; And if $\frac{45}{8}$ were reduced, it would be $3\frac{5}{12}$, and ſo of any other.

To

To reduce a Compound Fraction into a Single Fraction.

Multiply all the Numerators one into another for a new Numerator, and the Denominators one into another for a new Denominator, ſo you have the ſingle Fraction ſought.

So, if $\frac{3}{4}$ of $\frac{5}{9}$ were reduced into a ſingle Fraction it would be $\frac{15}{36}$, and $\frac{1}{2}$ of $\frac{2}{3}$ of $\frac{3}{4}$ would be $\frac{6}{24}$, or $\frac{1}{4}$.

Reduce me $\frac{4}{5}$ of $\frac{5}{6}$ of $\frac{7}{8}$ of $\frac{9}{12}$ to a ſingle Fraction.

$$\frac{4}{5}\ \frac{5}{6}\ \frac{7}{8}\ \frac{9}{12}$$

$$\frac{20}{30}\ \frac{7}{8}\ \frac{9}{12}$$

$$\frac{140}{240}\ \frac{9}{12}$$

Nume. $\frac{1260}{2880}$ Denominator.

Anſw. $\frac{1260}{2880}$ or $\frac{126}{288}$ $\overset{18}{=}$ $\frac{7}{16}$ in its loweſt Terms, and ſo of any other.

Addition *of* Vulgar Fractions.

IF the FRACTIONS to be added have a common Denominator, add the Numerators together for a Numerator, and place it over the common Denominator.

EXAMPLE.

Add $\frac{2}{5}$ $\frac{3}{5}$ and $\frac{4}{5}$ of a Pound Sterling together: Say, 2 and 3 is 5 and 4 is 9, the Numerator; and this Improper Fraction is in Value 36 Shillings, for 9 Times 4 is 36 Shillings; for I ſay the 5's

in

in 9, once, and 4 remains, which is $\frac{4}{5}$ of a Pound, equal to 16 Shillings.

So the Answer is 1 *l.* 16 *s.* 0 *d.* as by the Work,

		Opperation.
add	2	5|9 | 1 *l.* 16 *s.* 0 *d.*
	3	
	4	5
Numerator,	9	Remains $\frac{4}{5}$ = 16
Denominator,	5	

But if the Fractions to be added have unequal Denominators, then they must be reduced to a common Denominator by the Rule before shewn, before Addition can be made, and then proceed as above.

When mixt Numbers are to be added, work with the Fractional Parts as before, and carry the Fractional Value to the whole Numbers.

Add $27\frac{1}{5}$ to $39\frac{1}{5}$.

$39\frac{2}{5}$

L. 67 Answer.

Or you may reduce the Quere into an Improper Fraction, thus;

l.	*l.*
$27\frac{1}{5}$	$39\frac{2}{5}$
3	3
82	119
3	3

119
82
3 | 201

L. 67 as before.

When

When Compound Fractions are to be added to Simple Ones, reduce the Compound Fraction to a Simple One, as before.

EXAMPLE.

Add $\frac{2}{8}$ and $\frac{3}{8}$ to $\frac{1}{2}$ of $\frac{1}{4}$ of a Pound; Thus, Once 2 is 2, and twice 4 is $\frac{8}{8}$, the Compound Fraction. Then ſay, 2 and 3 is 5 and 2 is $\frac{7}{8}$, equal in Value to 17 *s.* 6 *d.*

2
1
2
4
8

3
2
2
7

$\frac{7}{8}$ and $\frac{7}{8}$ of a Pound Sterl. is 17 *s.* 6 *d.*

To $\frac{2}{3}$ add $\frac{5}{6}$. The Fractions in a Common Denominator are, $\frac{12}{18}$ $\frac{15}{18}$.

12 The firſt Numerator.
15 The ſecond Numerator.

27 The Sum, which divided by 18, is $1\frac{9}{18}$.
Or, $1\frac{1}{2}$ The Anſwer.

Subtraction of *Vulgar Fractions.*

IN this Rule the Fractions muſt have a Common Denominator, or be reduced to One, before Deduction can be made.

What's the Difference between $\frac{1}{4}$ and $\frac{3}{4}$? Anſwer, $\frac{2}{4}$ or $\frac{1}{2}$; and proved by *Addition*, for $\frac{1}{4}$ and $\frac{2}{4}$ is equal to $\frac{3}{4}$ or 3 Quarters: If the Denominators are equal, the Difference between the Numerators is the Anſwer, as above.

What's

What's the Difference between $\frac{3}{4}$ and $\frac{5}{12}$ of a Pound?

Here the Fractions are to be reduced to a Common Denominator.

12	4	36	12
3	5	20	4
1st N. 36	2d N. 20	16 Differ.	48 Com. Den.

So $\frac{16}{48}$, or $\frac{1}{3}$ in its loweſt Terms, is the Difference between $\frac{3}{4}$ of a Pound and $\frac{5}{12}$ of a Pound, that is 6 *s.* 8 *d.*

	s.	*d.*
By whole Numbers, $\frac{3}{4}$ of a Pound equal	15	00
$\frac{5}{12}$ of a Pound equal	8	04
Difference as before is	6	08

To Subtract a Compound Fraction from a Simple One.

RULE.

Reduce the Compound Fraction to a Simple One; then work as before.

From $\frac{13}{14}$ take $\frac{2}{3}$ of $\frac{8}{9}$.

The laſt Quere explained.

From $\frac{13}{14}$ take $\frac{2}{3}$ of $\frac{8}{9}$. Say, twice 8 is 16, and 3 Times 9 is 27, the Compound Fraction. Then $\frac{13}{14}$ and $\frac{16}{27}$ muſt be reduced to a Common Denominator, thus; 13 Times 27 is 351, the firſt Numerator; and 14 Times 16 is 224, the ſecond Numerator; and 14 Times 27 is 378, the Common Denominator; then Subtract 224, the ſecond Numerator, from 351, the firſt Numerator, and the Remainder is 127; which, place over 378, the Common Denominator, thus, $\frac{127}{378}$, the Anſwer required. When

When a Simple Fraction is to be deducted from a Whole Number. RULE.

Subtract the Numerator of the Fraction from the Denominator, and place the Remainder over the Denominator, and carry One to subtract from the Whole Number, *&c.*

EXAMPLE.

From 12 *l.* take $\frac{5}{8}$. Say, 5 the Numerator from 8 the Denominator, and there remains 3, which place over the Denominator 8, thus $\frac{3}{8}$; then 1 from 12 and there remains 11: So the Answer is 11 *l.* $\frac{3}{8}$, or 11 *l.* 7 *s.* 6 *d.* as may be proved by Whole Numbers.

The Reason of this Rule of *Subtraction* is so plain from what was said of *Addition* as to the Common Denominators: And if the Denominators are alike, the Difference between their Numerators is the Difference between the Fraction, as may be proved by adding that Difference to the Fraction subtracted: As $\frac{1}{4}$ from $\frac{3}{4}$, rest $\frac{2}{4}$; for $\frac{2}{4}$ and $\frac{1}{4}$ is $\frac{3}{4}$, as before.

Multiplication of Vulgar Fractions.

RULE.

MULTIPLY the Numerators one into another for a Numerator of the Product, and then do the same by the Denominators for a Denominator of the Product.

EXAMPLE.

Multiply $\frac{3}{4}$ of a Pound by $\frac{5}{6}$ of a Pound.

5 6

3 4

15 the Numerat. 24 the Denominator, thus,

$\frac{15}{24}=\frac{5}{8}$ or 12 *s.* 6 *d.*

Note, That *Multiplication* of *Fractions* leſſens the Product, tho' in Whole Numbers it augments it as above, $\frac{5}{8}$ is leſs than $\frac{5}{6}$, and alſo leſs than the other Fraction $\frac{3}{4}$, for $\frac{5}{8}$ is equal to 12 *s.* 6 *d.* and $\frac{5}{6}$ is equal to 16 *s.* 8 *d.* and $\frac{3}{4}$ is equal to 15 *s.* 0 *d.* which $\frac{15}{24}$ or $\frac{5}{8}$ is leſs than the Sum of either of the Fractions, yet the Product of both.

Multiply 2 *s.* 6 *d.* by 2 *s.* 6 *d.* vulgarly.

Note, 2 *s.* 6 *d.*$=\frac{1}{8}$.

$\frac{1}{8}\times\frac{1}{8}=\frac{1}{64}$ Part of a Pound is equal to 3 *d.* $\frac{3}{4}$.

To multiply a Whole Number by a Fraction.

Rule. Multiply the Integer by the Numerator of the Fraction, and place the Product over the Denominator.

Multiply me 56 *l.* by $\frac{3}{4}$.

56

3

168

4

This improper Fraction $168\frac{3}{4}$ reduced, makes but 42 *l.* which is leſs than 56 *l.* and confirms what was before aſſerted.

To Multiply a Simple by a Compound Fraction.

Rule. Reduce the Compound Fraction to a Simple One, and work as above.

Multiply $\frac{6}{8}$ of a Pound by $\frac{2}{3}$ of $\frac{3}{4}$ of a Pound.

Say, 2 Times 3 is 6, and 3 Times 4 is 12; the Compound Fraction is $\frac{6}{12}$. Then 6 Times 6 is

36,

36, and 8 Times 12 is 96. So the Anſwer is $\frac{36}{96}$, or $\frac{3}{8}$ in its loweſt Terms is equal to 7 *s.* 6 *d.*

Multiply me $\frac{2}{3}$ of a Pound by $\frac{3}{4}$ of $\frac{5}{6}$ of a Pound.

	3	4
	5	6
Numer.	15	24 Then $\frac{2}{3}\times\frac{15}{24}=\frac{30}{72}=\frac{5}{12}$ or 8 *s.* 4 *d.*
Denom.	24	Anſwer, 8 *s.* 4 *d.* again.

Mul. $\frac{9}{16}$ of a Pound by $\frac{1}{2}$ of $\frac{2}{3}$ of $\frac{3}{4}$ of a Pound.

	1	2
	2	3
	2	6 $\frac{9}{16}\times\frac{6}{24}=\frac{54}{432}=\frac{1}{8}$, or 2 *s.* 6 *d.*
	3	4
Numer.	6	24 Denominator.
Denom.	24	

Diviſion of Vulgar Fractions.

TO Divide a Simple Fraction by a Simple One.

RULE.

Having placed the Dividend and Diviſor as in Whole Numbers: Then Multiply the Numerator of the Diviſor into the Numerator of the Dividend for the Numerator of the Quotient: And the Denominator of the Diviſor into the Denominator of the Dividend for the Denominator of the Quotient.

Divide $\frac{5}{6}$ by $\frac{3}{4}$ of a Pound.

$\frac{3}{4})\frac{5}{6}(\frac{20}{24}=\frac{5}{8}$, or 12 *s.* 6 *d.* Anſwer.

Divide $\frac{4}{6}$ by $\frac{2}{3}$ of a Pound.

$\frac{2}{3})\frac{4}{6}(\frac{8}{12}$, or 8 *s.* 4 *d.* Anſwer.

To Divide a Whole Number by a Fraction.

Rule. A Unit under the Whole Number, and work as in the laſt.

Divide 56 *l.* by $\frac{3}{4}$ of a Pound.

$\frac{3}{4}) \frac{56}{1} (\frac{168}{4} = 42$ *l.* Anſwer.

Divide 72 *l.* by $\frac{2}{3}$ of a Pound.

$\frac{2}{3}) \frac{72}{1} (\frac{144}{3} = 48$ *l.* Anſwer.

To Divide a Simple Fraction by a Compound One.

Rule. Reduce the Compound to a Simple Fraction, and work as by the firſt Rule.

Divide $\frac{6}{8}$ by $\frac{2}{3}$ of $\frac{3}{4}$. The Compound Fraction is $\frac{6}{12}$.

$\frac{6}{12}) \frac{6}{8} (\frac{36}{96} = \frac{3}{8}$, or 7 *s.* 6 *d.*

And ſo of any other.

The Rule of Three in VULGAR FRACTIONS.

IN the *Rule of Three*, or *Golden Rule* in *Vulgar Fractions*, if any of your Terms be Integers mixt, or Compound Fractions, they muſt be reduced, as hath been before ſhewn; then ſtating your Queſtion as in the *Single Rule* aforegoing, and multiplying and dividing as in Multiplication and Diviſion of *Vulgar Fractions*, your Work is finiſhed, and the Quotient gives the Anſwer.

If $\frac{3}{4}$ of a Yard of Luteſtring-Silk coſt 7 *s.* 3 *d.* what will $9\frac{1}{3}$ Yards coſt?

If $\frac{3}{4} : \frac{87}{240} :: \frac{28}{3}$ contracted thus,

If $\frac{3}{4} : \frac{29}{80} :: \frac{7}{1} = \frac{203}{80}$ and yet continued,

Thus, If $\frac{3}{1} : \frac{29}{15} :: \frac{7}{1} = \frac{203}{45} = 4$ *l.* 10 *s.* 2 *d.* $\frac{1}{2}\frac{2}{3}$.

This

This Quere further explained, thus, Seeing the Denominator of the two laſt Terms, and their Altern Numerators, may be ſeverally abbreviated One, *viz.* The Number of the laſt Term, and the Denominator of the Second by 4; and the Number of the Second Term, and Denominator of the laſt by 3; the contracted Terms of which are $\frac{2\,9}{6\,0}$ for the ſecond Term, and $\frac{7}{1}$ for the Third or laſt Term: Then the Work will ſtand thus, If $\frac{3}{4} : \frac{2\,9}{6\,0} :: \frac{7}{1}$. And ſeeing again the Denominator of the laſt Term is an Unit, and the Denominators of the two firſt Terms may be abbreviated by 4, after which the 3 Terms offer themſelves thus, If $\frac{3}{1} : \frac{2\,9}{1\,5} :: \frac{7}{1}$. And the fourth Term is eaſily found by multiplying the Numerator of the Quotient; and the Numerator of the firſt Term by the Denominator of the Second, for the Denominator of the ſaid Quotient: So the fourth Term ſought will be $\frac{2\,0\,3}{4\,5}$ equal to 4 *l.* $\frac{2\,3}{4\,5}$, or 4 *l.* 10 *s.* 2 *d.* $\frac{1}{1}\,\frac{2}{3}$, as by the Work.

If $\frac{3}{4}$ of a Pound of Cotton $\frac{8}{1}$ Pence, what will 1 Pound coſt?

If $\frac{3}{4} : \frac{8}{1} :: \frac{1}{1}$

$\frac{3}{4} \mid \frac{8}{1} \mid 3\,\frac{2}{3} = 10\,d.\,\frac{2}{3}$ Anſwer.

If either of the Extreams be a Fraction, and the other as here, reduce it to a like Denomination, cancel the Denominators, and work as in Integers. So, if 3 *qrs.* 8 *d.* 4 *qrs.* give?

Anſwer, 10 *d.* $\frac{2}{3}$, as before.

If $\frac{3}{4}$ of a Pound of Cotton coſt 9 Pence, what will 1 Pound coſt?

If $\frac{3}{4} : \frac{9}{1} :: \frac{1}{1}$

If $\frac{3}{4} \mid \frac{9}{1} \mid 3\,\frac{6}{3} = 12\,d.$ equal 1 Shilling.

If

If $\frac{1}{7}$ of a Yard of Callamanco coſt 3 *s.* what will 1 Yard coſt?

If $\frac{1}{7} : \frac{3}{7} :: \frac{1}{1}$

$\frac{1}{7} \mid \frac{3}{7} \mid {}^{1}\frac{1}{7}$ 3 *s.* $\frac{3}{7}$ equal 3*s.* 5*d.* $\frac{3}{7}$ Anſwer.

If $\frac{4}{8}$ of a Pound of Indico coſt 2 *s.* what will 1 Pound coſt?

If $\frac{4}{8} : \frac{2}{1} :: \frac{1}{4}$

$\frac{4}{8} \mid \frac{2}{1} \mid {}^{1}\frac{2}{4} =$ 3 *s.* 0 *d.* Anſwer.

Theſe three laſt Queſtions may be brought into Whole Numbers.

If 3 Men do a Piece of Work in $4\frac{1}{2}$ Hours, in how many Hours ſhall 10 Men do the ſame Work?

If $\frac{3}{1} : \frac{9}{2} :: {}^{10}\frac{0}{1} = {}^{2}\frac{7}{2}$ Firſt and ſecond Terms.

${}^{10}\frac{0}{1} \mid {}^{2}\frac{7}{2} \mid \frac{27}{20} =$ to 1 Hour and $\frac{7}{10}$.

In this Quere the laſt Term was my Diviſor, becauſe more Men require leſs Time.

If the Penny White-Loaf weighs 7 Ounces, when the Buſhel of Wheat is ſold for 5 *s.* 6 *d.* what muſt the Buſhel coſt when the Penny White-Loaf weighs but $2\frac{1}{2}$ Ounces.

If $\frac{7}{12} : {}^{1}\frac{1}{2} :: \frac{5}{24} = \frac{77}{24}$ 1ſt and 2d Terms.

$\frac{5}{24} \mid \frac{77}{24} \mid {}^{7}\frac{7}{5} =$ 15 *s.* $\frac{2}{5}$, or 15*s.* 4*d.* $\frac{3}{4}\ \frac{1}{5}$ Anſw.

Seeing the Denominators of the Dividend and Diviſor are both equal, throw them away; the Numerator of the Dividend is the Numerator of the Quotient, and the Numerator of the Diviſor is the Denominator thereto.

If

If $\frac{3}{4}$ of a Pound of Vermillion coſt $\frac{7}{8}$ of a Pound Sterling, what will $\frac{32}{36}$ of a Pound coſt at that Rate?

If $\frac{3}{4} : \frac{7}{8} :: \frac{32}{36} = \frac{256}{252}$.

$\frac{3}{4} \mid \frac{256}{252} \mid \frac{1024}{756} = 1\,l.\ 7\,s.\ 1\,d.\ \frac{60}{756}$.

The Double Rule of Three in Vulgar Fractions.

IN this *Rule of Three Double* in *Vulgar Fractions*, obſerve the ſame Method in placing your Numbers as if they were whole Numbers, and the Work will be eaſy.

Example. If 13 *l.* 6 *s.* 8 *d.* in $\frac{3}{4}$ of a Year gain $1\frac{1}{12}$ *l.* what will 50 *l.* gain in 5 Months?

l. *l.* *l.*

If $\frac{40}{3} : \frac{13}{12} :: \frac{50}{1}$ $\frac{650}{12}$ 2d and 3d Numb. Xd.

$\frac{40}{3} \mid \frac{650}{12} \mid \frac{19500}{480} = 4\,l.\ \frac{1}{16}$: 1 *s.* 3 *d.* abbreviated to $\frac{65}{16} = 4\,l.\ 1\,s.\ 3\,d.$

Y. *l.* *Year.*

If $\frac{3}{4} :$ $\frac{19500}{480} :: \frac{5}{12}$ $\frac{97500}{57600}$ abbreviated $\frac{3255}{1952}$.

$\frac{3}{4} \mid \frac{3255}{1952} \mid \frac{13020}{5760} = \frac{3255}{1444}$ equal to 2*l.* 5*s.* 1*d.* $\frac{1}{2}$ $\frac{5}{9}$

If $\frac{40}{3}$ of a Pound in $\frac{3}{4}$ of a Year gain $\frac{13}{12}$ of a Pound, what will $\frac{50}{1}$ *l.* gain in $\frac{5}{12}$ of a Year?

l. *Y.* *l.* *l.* *Year.*

If $\frac{40}{3} : \frac{3}{4} : \frac{13}{12} :: \frac{50}{1} : \frac{5}{12} = \frac{32500}{1444}$ 3 laſt N°.

$\frac{40}{3} \times \frac{3}{4} = \frac{120}{12}$

$\frac{120}{12} \mid \frac{32500}{1444} \mid \frac{3900000}{172880} = 2\,l.\ 5\,s.\ 1\,d.\ \frac{1}{2}\ \frac{5}{9}$.

Abbreviated thus, $\frac{60}{6} \mid \frac{1625}{72} \mid \frac{97500}{43320} = 2\,l.\ 5\,s.\ 1\,d.\ \frac{1}{2}\ \frac{5}{9}$

You

You may cancel the Cyphers both in the Numerator and Denominator of the Quotient, and the Fractions are the ſame Value.

If 50 Pounds in 5 Months gain 2 *l.* 5*s.* 1*d.* $\frac{1}{2}$ $\frac{1}{3}$, in what Time will 13 *l.* 6 *s.* 8 *d.* gain 1*l.* 1*s.* 3*d.*

l. Tear.

If $\frac{50}{1} : \frac{5}{12} :: \frac{40}{3} = \frac{250}{312}$ 1ſt and 2d Numbers.

$\frac{40}{3} \mid \frac{250}{12} \mid \frac{750}{480} = 1\frac{9}{16}$ Year.

Say again, If $\frac{325}{144} : \frac{45}{16} :: \frac{13}{12} = \frac{325}{192}$

$\frac{325}{144} \mid \frac{325}{192} \mid \frac{6240}{4608} \mid \frac{00}{00} = \frac{3}{4}$ or 9 Months.

Note, The former Proportion was Inverſe, and the latter was Direct.

Numeration of Decimals.

A Decimal Fraction is known by a Prick or Point made with the Pen, and thoſe Figures on the Left-Hand the ſaid Prick are Whole Numbers or Integers, and thoſe on the Right-Hand are Decimal Parts; by which Prick their Value are decreaſed from ſo many Units to ſo many Ten Parts of a Unit; and if a Prick and two Figures be in the Decimal Parts, then they will be ſo many Hundred Parts, and ſo on.

Obſerve

Obſerve the following TABLE.

Whole Numbers.								*Decimal Parts.*						
7	6	5	4	3	2	1	0.	1	2	3	4	5	6	7
Tens of Millions.	Millions.	Hundreds of Thouſands.	Tens of Thouſands.	Thouſands.	Hundreds.	Tens.	Units Place.	Primes, or Ten Parts.	Hundreds Parts.	Thouſands Parts.	Tens of Thouſands Parts.	Hundreds of Thouſands Parts.	Millions Parts.	Tens of Millions Parts.

As in Whole Numbers, the Value or Denomination of Places increaſes by Tens from the Units, place towards the Left-Hand; ſo in Decimals, the Value or Denomination of Places decreaſe by Tens from the Units, place towards the Right-Hand, as by the Table.

A *Decimal Fraction*, whether it ſtands alone, or be joined with Whole Numbers, is diſtinguiſhed from a Whole Number by a Prick before it towards the Left-Hand, with the Point of your Pen, as follows.

A Decimal.	*A Mixt* N°	*A Mixt* N°	*A Whole* N°
.2565	2.565	25.65	2565

In *Decimal Fractions* the Numerator is only ſet down, and the Denominators are known by

Inſpection; for it is as many Cyphers, with an Unit annexed, as there are Figures in the Numerator; for if the Numerator conſiſt but of one Place, as .4, the Denominator is 10; but if of two Places, as .45, the Denominator is 100, and ſo on.

Hence it is evident that the Denominator

of { .3 / .55 / .725 / .8725 } is { 10 / 100 / 1000 / 10000 } And ſo of any other.

As Cyphers before a Whole Number have no Value, ſo Cyphers after a Decimal are of no Value; and therefore will not increaſe the Fraction, nor alter the Denominator, as follows.

Hence it is evident, That .5 is 5 Tenths, and .50 is 50 Hundreds; and yet it is no more than 5 Tenths, and the one is equal to the other.

Again, As Cyphers after a Whole Number do increaſe that Number, ſo Cyphers before a *Decimal Fraction* do decreaſe the Value thereof, as follows.

Hence, I ſay again it is evident,

That { .5 / .05 / .005 / .0005 } is 5 { Tenth Parts. / Hundred Parts. / Thouſand Parts. / Ten Thouſand Parts. }

Here every Cypher added removes the Fraction further from Unity, making it Ten Times leſs than it was before.

I have heard it argued by Men who pretended to underſtand *Decimal Arithmetick* well, That a Cypher was no Number. But my Opinion is both Ways,

Ways. Hence, I ſay, That a Cypher placed before a Whole Number neither increaſes nor decreaſes the Value, and therefore can be no Number there: But if placed after a Whole Number or before a *Decimal*, it either increaſes or decreaſes the Value in a Ten-fold Proportion, according as it is placed.

That { 2 02 .02 .2 20 } is { Two. Two, as before, in Whole N°. Two Hundred Parts. Two Tenth Parts. Twenty in Whole Numbers. }

And ſo of any other.

Reduction of Decimals.

RULE.

TO any *Vulgar Fraction* given, annex Cyphers to the Numerator as you have Occaſion for them, and Divide by the Denominator, and the Quotient thence ariſing will be the *Decimal* Parts required, and the ſame in Value to the *Vulgar Fraction* given.

Or by this Proportional Rule.

As the Denominator of the Vulgar Fraction given
Is in Proportion to its Numerator,
So is an Unit, with Cyphers annex'd,
To the Numerator of the Decimal required.

What's the Decimal ¾, One Penny the Integer?

4 | 3.00 | .75 Anſwer. This is by the 1ſt Rule.

Second Rule. As 4 : 3 : 1.00

3

4 | 3.00 | .75 Anſwer, as before; but the firſt Rule I ſhall uſe.

What's the Decimal to 6 *d.* ½, One Shilling the Integer?

12

2 | 1.0 | 6.5 | .54166 Anſwer.

What's the Decimal of 8*d* ¼, One Shill. the Integer.

12

4 | 3.00 | 8.75 | .729166 Anſwer.

What's the Decimal to 9 *d.* One Shill. the Integer.

12 | 9.00 | .75 Anſwer.

What's the Decimal to 10*d.* ¾, One Shilling the Integer?

12

4 | 3.00 | 10.75 | .895833 Anſwer.

Obſerve, that I ſuppoſe Cyphers added in ſeveral Places, and ſhall do ſo hereafter, but not expreſs them.

What's the Decimal to 1 *s.* 4 *d.* ½, A Pound Sterling the Integer?

12 2|0

2 | 1.0 | 4.5 | 1.375 | .06875 Anſwer.

In this laſt I added a Cypher to the Left-Hand the Anſwer: But more of that hereafter in the Valuation of Decimals.

Now

Now I ſhall ſhew you how old Authors would anſwer the laſt Quere.

Firſt, they'd reduce the Money into the loweſt Name mentioned.

Thus, 1 *s.* 4½ *d.*

12

16

4

Far. 66

far.

Which 66 they Divide by the Farthings in one Pound.

96|0 | 66.0000|0 | .06875 Anſwer.

576

840

768

720

672

480

480

00

But I ſhall not make Uſe of this Method any more, for mine is quicker, and done with more Eaſe.

What's the Decimal to 2 *s.* 6 *d.* One Pound the Integer?

2|0

12 | 6.0 | 2.50 | .125 Anſwer.

What's the Decimal to 4 *s.* 8 *d.* ½, One Pound the Integer?

12 2|0

2 | 1.0 | 8.5 | 4.70833 | .2354 Anſwer. 4 Places are ſufficient for Money, and 6 are a ſufficient Number of Decimals for any Denomination.

What's the Decimal to 15 *s.* 6 *d.* One Pound the Integer?

2|0

12 | 6.0 | 15.5 | .775

What's

What's the Decimal to 16 *s.* 11 *d.* ¾, One Pound the Integer?

12 2|0

4 | 3.00 | 11.75 | 16.979 | .84895 Anſwer.

What's the Decimal to 18 Shill. One Pound the Integer. 2|0 | 18.0 | .9 Anſwer.

To find Decimals for Money is certainly one of the eaſieſt Parts in all Arithmetick; For if your Shillings are an even Number, Half of them is the Decimal of a Pound.

As in the laſt Quere, the Half of 18 is .9, and is the Decimal required; and ſo of any other even Number of Shillings.

And if your Number of Shillings are odd, put or add a Cypher to the Right-Hand, and then Half the Number is the Decimal required.

What's the Decimal to 19 Shillings, One Pound the Integer?

½ | 190 | .95 the Anſwer required by the laſt Rule.

And laſtly, If you have a good Memory you may write down, or tell by Heart, the Decimal equal in Value to any Number of Shillings, Pence, and Farthings, without working by the foregoing Rules.

If your Number of Shillings be even, Half of them is the Decimal required.

Suppoſe you was required to tell the Decimal to 6 Shillings.

Say, Half of 6 is .3, which is the Decimal required.

Suppoſe

Suppoſe you was required to tell the Decimal to 8 *s.* 6 *d.*

Say, Half of 8 *s.* is 4 Tenths, and the Decimal for 6 *d.* after the Tenth's Place is .25; ſo .425 is the Decimal required.

Admit, 16 *s.* 9 *d.* $\frac{1}{2}$ was required in Decimals.
.835 is the Anſwer.

Admit, 17 *s.* 6 *d.* was required in Decimals?
.875 is the Anſwer.

Admit, 17 *s.* 9 *d.* was required in Decimals?
.8875 is the Anſwer.

And if only Pence and Farthings was required, uſe this Rule.

Reduce your Pence and Farthings into Farthings, and add a Cypher to the Left-Hand, and you have the Anſwer required in the Decimal of a Pound. But if your Farthings exceed 23, call them One more; if 39, call them 2 more.

Admit, 6 *d.* was required in Decimals?
Obſerve, in 6 *d.* are 24 Farthings, which call .25, and is the Decimal required.

Admit, 8 *d.* was required in Decimals?
.033 is the Decimal required.

Admit, 9 *d.* $\frac{1}{4}$ was required in Decimals?
.038 is the Decimal required.

Admit, 11 *d.* $\frac{1}{4}$ was required in Decimals?
.048 is the Decimal required.

Admit,

Admit, 1 *s.* was required in Decimals?
.05 is the Decimal required.

I hope I have ſatisfied the moſt Curious; for I have had Scholars that wou'd have anſwered by Heart as quickly as required.

What's the Decimal to 7 Ounces, One Pound Troy the Integer?

12 | 7.000 | .5833 the Anſwer required.

What's the Decimal to 8 *oz.* 10 *pwt.* 12 *grs.* 1 Pound Troy the Integer?

2|0 12
24 | 12.0 | 10.5 | 8.525 | .7104166 Anſwer.

What's the Decimal to 14 *C.* 2 *qrs.* 14 *lb.* 8 *oz.* One Ton being the Integer?

28 4 2|0
16 | 8.0 | 14.5 | 2.5178 | 14.62945 | .7314725 Anſw.

What's the Decimal to 7 *oz.* 6 *dr.* 2 *ſc.* 15 *gr.* One Pound Apothecary's Weight the Integer?

3 8 12
2|0 | 15.0|0 | 2.75 | 6.916 | 7.8645 | .65537 Anſwer.

Mon. W. D. H. Minutes.
What's the Decimal to 8 3 4 12 30 Twelve Months the Integer?

24 7 4 12
60 | 30.0 | 12.5 | 4.5208 | 3.645 | 8.911 | .7425 Anſ.

A TABLE,

A TABLE, ſhewing by Inſpection, what Decimal Part of One Hundred any Number of Pounds are.

qr.	lb.		qr.	lb.		qr.	lb.		qr.	lb.	
0	0	.0	1	0	.25	2	0	.5	3	0	.75
	1	.0089		1	.2589		1	.5089		1	.7589
	2	.0178		2	.2678		2	.5178		2	.7679
	3	.0267		3	.2767		3	.5267		3	.7768
	4	.0357		4	.2857		4	.5357		4	.7857
	5	.0446		5	.2946		5	.5446		5	.7946
	6	.0535		6	.3035		6	.5535		6	.8035
	7	.0625		7	.3125		7	.5625		7	.8125
	8	.0714		8	.3214		8	.5714		8	.8214
	9	.0803		9	.3303		9	.5803		9	.8303
	10	.0892		10	.3392		10	.5892		10	.8392
	11	.0982		11	.3481		11	.5982		11	.8482
	12	.1071		12	.357		12	.6071		12	.8571
	13	.116		13	.366		13	.616		13	.866
	14	.125		14	.375		14	.625		14	.875
	15	.1339		15	.3839		15	.6339		15	.8839
	16	.1428		16	.3928		16	.6428		16	.8928
	17	.1518		17	.4017		17	.6517		17	.9017
	18	.1607		18	.4106		18	.6607		18	.9107
	19	.1696		19	.4195		19	.6696		19	.9196
	20	.1785		20	.4284		20	.6785		20	.9285
	21	.1875		21	.4375		21	.6875		21	.9375
	22	.1964		22	.4464		22	.6963		22	.9464
	23	.2053		23	.4552		23	.7053		23	.9553
	24	.2143		24	.4641		24	.7142		24	.9642
	25	.2232		25	.4731		25	.7232		25	.9731
	26	.2321		26	.482		26	.7321		26	.9821
	27	.2411		27	.4919		27	.741		27	.991

Valuation of Decimals.

VALUATION of DECIMALS is that moſt excellent Rule which teacheth to find the Value of any *Decimal* given.

RULE.

Multiply your Fraction given by the Number of Units as is contained in the next Inferior Denomination, and prick off as many Figures towards the Right-Hand as there are in the Decimal Fraction given: And if it muſt be reduced lower, multiply by the next Inferior Denomination, and prick off as many as before, &c. till you have reduced it as low as you pleaſe.

What's the Value of .125 a Pound Sterl. the Integer?

20 Shillings in the next lower [Denomination.

2.500

12 Pence in the next D°.

6.000 Anſw. 2*s.* 6*d.* the Value.

What's the Value of .69375, a Pound Sterling the Integer?

20

13.87500

12

10.50000 Anſw. 13*s.* 10*d.* ½

4

2.00000

What's the Value of .875, a Pound Ster. the Integer?

20

17.500

12 Anſwer, 17*s.* 6*d.*

6.000

But

But yet I think this Way too far fetch'd; But obſerve the following Rule, and you may know the Value by Inſpection in *Britiſh* Money.

Double the firſt Figure ſtanding next the Prick in the Decimal given, and if the next Figure towards the Right-Hand be 5 or more, call it one more than what the ſaid Figure is above 5, call it ſo many Tens of Farthings; and what ſtands in the third Place from the Prick is ſo many Farthings more, which if they be above 13, abate 1; if above 39, abate 2.

The laſt Quere done by this Rule, *i. e.* .875, a Pound Sterling the Integer.

The Double of 8 is 16, and the next Figure being 7, call 16 one more, *i. e.* 17 Shillings; then there being 2 above 5 in the 7, is 20 Farthings; which, with the third Figure from the Prick, which is 5, makes 25 Farthings; and there being but One to abate for 13, you muſt call them 24 Farthings, which is equal to 6 *d.* So the Value is 17 *s.* 6 *d.* as above. You may obſerve the ſame for the other two Queries above, and ſo for any other.

The Reaſon of this Rule is evident from the following Words.

For that Place in a Decimal Fraction next the Prick is called *Primes*, being ſo many Tenth Parts of a Pound; ſo $\frac{1}{10}$ of a Pound being 2 *S.* ſo whatever Figure is in the firſt Place is a Double Number of Shillings. The Reaſon you add 1 to the Product is, as often as your ſecond Figure from the Prick is 5 or more, is becauſe, .05 of a Pound is 1 *S.* for .1 of a Pound is 2 *S.* then Half .1 which is .05 muſt be 1 *S.*

Laſtly. Your accounting the ſecond and third Places from the Prick ſo many Farthings, ſuppoſes 1000 Farthings in a Pound, and there are but 960, that Rule muſt be ſomething falſe, but it's near enough the Truth for ordinary Practice; eſpecially if for the 40 Farthings which the 1000 exceeds 960, you make this Allowance of abating One at 25, for if 1000 is 40 too much, 500 is 20 too much, 250 is 10 too much, 50 is 2 too much, and 25 is 1 too much; ſo the Computation for 13 is ſomewhat more than Half a Farthing too much: But if you abate a Farthing at all Decimals between 13 and 39 it may be near enough; for leſs than a Farthing is never received or paid in Sterling Money.

Hence it's evident, That the Value of .886 is 17 *s.* 8 *d.* $\frac{3}{4}$.

Alſo it is plain, That the Value of .01875 is 4 *d.* $\frac{1}{2}$.

What's the Value of .3875 a Ton Averdupoiſe Wt. the Integer? 20 next inferior Denom.

7.7500
4 next D°.
3.0000

C. qrs.
Anſwer, 7 3

What's the Value of .7365 One Acre Land Meaſure the Integer? 4 Roods is one Acre.

2.9460
40 Poles is one Rood.
37.8400

Anſwer, 2 Roods 37 $\frac{3}{4}$ Poles, and ſomewhat more.

What's

What's the Value of .7485 Twelve Months the Integer?

12
8.9820
4
3.9280
7
M. W. D.
6.4960 Answer, 8 3 6, &c.

I hope I need not explain any more, but leave the Rule, for the Value of all Sorts of Weights and Measures are found by the same Rule according to their Denominations.

Addition of Decimals.

ADDITION of DECIMALS is the same in Operation as Whole Numbers, save in this, That the Decimal Places must be prickt off in the Product, just as many as there are Number of Places in the greatest Decimal given, and the Total will be the same in Value as if they were Whole Numbers or Vulgar Fractions, as follows:

By Decimals.	*By Vulgar Fractions.*	*By Whole Numbers.*
L.	*L.*	*L. S.*
24.25	24 $\frac{1}{4}$	24 05
36.75	36 $\frac{3}{4}$	36 15
42.5	42 $\frac{1}{2}$	42 10
l. 103.50 Anſ.	*l.* 103 $\frac{1}{2}$	*l.* 103 10 as before.

So you see the Totals are all equal in Value.

Take

Take another by Whole Numbers and Decimals.

l.	*s.*	*d.*		*l.*
124	14	6 ½		124.727
36	13	9		36.6875
42	17	6 ½		42.878
36	10	8 ¾		36.536
L. 240	16	6 ¾	Anſwer.	*L.* 240.8285 as before.

Subtraction of Decimals.

SUBTRACTION of DECIMALS is the ſame in Operation as Whole Numbers, for you muſt Subtract them as Whole Numbers: And from their Difference prick off as many for Decimals as there are in the greateſt Number given.

	By Decimals.	*By Vulgar Fractions.*	*By Whole Numb.*		
	L.	*L.*	*l.*	*s.*	*d.*
From	29.875	29 ⅞	29	17	6
Take	14.75	14 ⅝	14	15	0
Differ.	15.125	*L.* 15 ⅛	*L.* 15	02	6

So you ſee the Differences are all equal in Value.

	By Decimals.	*By Whole Numbers.*		
	L.	*l.*	*s.*	*d.*
From	11.596875	11	11	11 ¼
Take	5.80625	5	16	01 ½
Difference	5.790625	*L.* 5	15	09 ¾

Obſerve, there are 6 Places of Decimals in the higher Number, ſo there muſt be the ſame Number in the Difference Line, and ſo of any other.

Multiplication

Multiplication of Decimals.

IN MULTIPLICATION of DECIMALS you muſt place your Factors, and work as in Whole Numbers: But after you have found the Product obſerve this GENERAL RULE.

To prick off ſo many Decimal Parts in the Product as there are in both the Factors accounted together.

	l.	*s.*	*d.*		*l.*	*s.*	*d.*
Multiply	7	7	6	by	2	9	6

Thus, 7.375 } Factors.
2.475 }

36875
51625
29500
14750

Obſerve, there are 3 Decimal Places in either Factor, ſo there muſt be 6 prickt off in the Product, beginning to count at the Right-Hand.

L. 18.253125 Anſwer, 18 *l.* 5 *s.* 0 *d.* $\frac{1}{4}$

Mul. 10 *S.* by 10 *S.* a Pound Sterling the Integer.

·5
·5

L. .25 Anſwer, 0 *l.* 5 *s.* 0 *d.*

This juſtify's what I ſaid in *Multiplication of Vulgar Fractions*, that Multiplying of Fractions decreaſes the Value thereof.

Multiply

Multiply 2 *s.* 6 *d.* by 2 *s.* 6 *d.* Decimally, a Pound Sterling the Integer.

.125
.125

625
250
125

.015625

Obſerve, here was but 5 Decimal Places in the Product, and there are 6 in the Factors, ſo I added a Cypher to the Left-Hand of the Product to make up the Number and the Value thereof.

Anſwer is 3 *d.* $\frac{1}{4}$, as before in *Vulgar Fractions.*

Multiply .008333 } Factors.
By .003125 }

41665
16666
8333
24999

.000026040625 Anſwer.

And ſo of any other.

Diviſion of Decimals.

DIVISION of DECIMALS or Mixt Numbers are performed after the Way as Whole Numbers, all the Difficulty is to know the Denomination of Places in the Quotient, and they are eaſily diſcovered by this one

GENERAL RULE.

Take Notice how many Decimal Places you have in the Diviſor, and how many in the Dividend; and as many as the Difference is, ſo many muſt be prickt off in the Quotient, beginning to count

count at the Right-Hand. But if ſo many Places are not in the Quotient as the Difference is, make up the Number by annexing Cyphers to the Left-Hand: But if there be not ſo many Places of Parts in the Dividend as in the Diviſor, make the Number equal by annexing Cyphers to the Right-Hand of the Dividend, then will the Quotient be a Whole Number.

This and all other General Rules ought to be got perfectly by Heart.

Divide 18.253125 by 2.475

2.475 | 18.253125 | 7.375 Anſwer.

17325
9281
7425
18562
17325
12375
12375
00

Obſerve here are 3 Decimal Places in the Diviſor, and 6. in the Dividend, the Difference is 3, ſo there muſt be 3 places prickt off in the Quotient for Decimals.

Divide 7.25406 by 957

957 | 7.25406 | .00758 Anſwer.

6699
5530
4785
7656
7656
00

Obſerve here are 5 Places of Decimals in the Dividend, and none in the Diviſor, ſo there muſt be 5 Decimal Places in the Quotient, and there are but 3 when Diviſion is ended; ſo I annex 2 Cyphers to the Left-Hand of the Quotient, and the Anſwer is as above.

Divide 441 by .7875

.7875 | 441.0000 | 560 Anſwer. To the Dividend I added 4 Cyphers to make the Decimal Places in it equal to thoſe in the Diviſor, and ſo the Quotient is a Whole Number.

39375
47250
47250
00

Divide .5 by .5

.5 | .5 | 1 Whole N°.
5
0

This juſtify's what I ſaid in *Diviſion of Vulgar Fractions*, which was, That dividing Fractions by Fractions, increaſes the Value as this; for ½ Divided by ½ quotes One, and ſo of any other.

Tare and Tret in Decimals.

AS for giving Rules concerning *Tare and Tret*, I hope you find I have ſufficiently done that in *Whole Numbers*. I ſhall work a few Queries by the calculated Table in *Reduction*, and ſo leave the Rule.

C. qrs. lb. *lb.*

In 242 3 16 of Sugar Groſs, Tare 14 ℔ Hundred; What Neat Weight, and what does the Neat Weight come to at 1 *l.* 17 *s.* 4 *d.* ℔ Hundred, and what is one Pound of this Sugar worth?

See the Tabular N°. for 3 *qrs.* 16 *lb.* in *Reduction* is .8928; then it will ſtand thus:

8 | 242.8928 Groſs.
30.2616 Tare.
212.5312 Neat.

C.	L.			lb.	l.	lb.
If 1	1.8666		If	112	18666	1
		1.8666			1	
		12751872		112	18666	.0166
		12751872			112	
		12751872			746	
		17002496			672	
		2125212				
L.		396.71073792 Anſwer.			746	
					672	
		Anſwer, 4 *d. per* Pound.			74	

In 6 Bags of Cotton marked with Groſs Weight as follows:

	C.	qr.	lb.	
A.	2	3	12	Tare 1 *lb.* ℔ Score, what does the Neat Weight come to at 6 *l.* 6 *s.* ℔ Hundred, and what is it ℔ Pound? *N. B.* This Quere is in *Tare and Tret* in Whole Numbers, and 2 Parts of it is wrong in this Book, Page 59, where there is 3 *lb.* more Tare than there ought to be.
B.	3	0	16	
C.	2	3	09	
D.	2	1	19	
E.	2	0	17	
F.	2	2	11	

2 | 0 | 16 0 00 Groſs.
3 05 Tare.
15 0 23 Neat.
6
15.2053
L. 63 ℔ Hundred
456159
912318
95.79339
Anſwer, 95 *l.* 15 *s.* 10 *d.* ½

lb.	L.	lb.
If 112	6.3	1
	1	
112	6.300	.05625 *per lb.*
	560	
	700	
	672	
	280	
	224	
	560	
	560	
	0	

Anſwer, 1 *s.* 1 *d.* ¼ ℔ Pound.

In 9 *C.* 3 *qrs.* 14 *lb.* Groſs of Hops, Tare 12 Pounds ℔ Hundred, What Neat Weight, and what does the Neat Weight come to at 1 *s.* 6 *d.* ℔ Pound?

9.875 Groſs.
100 is 112 Pounds, made leſs by 12, [which is the Tare.

½	987.500 Shillings.
	493.75 for 6 Pence.
2|0	1481.25

L. 74.0625 Anſwer, 74 *l.* 1 *s.* 3 *d.*

In 9 *C.* 2 *qrs.* 21 *lb.* Groſs Raiſins, Tare 14 *lb.* ℔ Hundred, Tret 4 *lb.* ℔ 104 *lb.* What Weight and what does the Neat Weight come to at 4 *d.* ℔ Pound?

C.
9.6875 Groſs.
98 is 112 *lb.* made leſs by [14 for Tare.

775000
871875

26	949.3750 Suttle.
	36.5144 Tret.

For 4 *d.* take ⅛ | 912.8606 Neat, at 4 *d.* ℔ Pound.

2|0	304.28686

L. 15.214343 Anſwer, *l.* 15 *s.* 4 *d.* 3¼

In

In 36 *C.* 3 *qrs* of Tobacco Groſs, Tare 28 *lb.* ℔ Hundred, What Neat Weight, and what does the Neat Weight come to at 1 Shilling ℔ Pound?

36.75
84 is 112, made leſs by 28 for Tare.

14700
29400

2|0 | 3087.00

L. 154.35 Anſwer, 154 *l.* 7 *s.* 0 *d.*

The Rule of Three in Decimals.

THE Method of Working the *Rule of Three* in *Decimals* is the ſame as in Whole Numbers, ſave in this, That in Whole Numbers the Numbers given are reduced to the loweſt Name mentioned: But in *Decimals* the Inferior Numbers are brought into the higheſt Name mentioned, and ſometimes higher than the Middle Number is brought in: And as in Whole Numbers, if the firſt and third Numbers be not of one Name or Denomination, they muſt be made ſo; and work as in Whole Numbers.

As for Inſtance, Take the firſt Example in the *Single Rule of Three* of Whole Numbers.

If

If 1 Yard of Cloth coſt 4 *s.* 6 *d.* What will 96 Yards coſt at the ſame Rate?

Yd.	*l.*	*Yds.*
If 1	225	96

96

1350

2025

L. 21.600 Anſwer, 21 *l.* 12 *s.* 0 *d.* and is the ſame as is there found.

The Reverſe.

If 96 Yards of Cloth coſt 21.6 *l.* what will one Yard coſt?

2|0

12 | .60 | 4.5 | .225

Obſerve, the Middle Number is brought into a Higher Name than was mentioned.

1

96 | 21.600 | .225

192 Anſwer, 4*s.* 6*d.*

240

192

480

480

00

C. qrs. lb. *l. s. d.* *C. qr. lb.*

If 4 3 14 of Sugar coſt 7 8 9 what will 14 1 12 coſt at that Rate?

C.	*l.*	*C.*
If 4.875	7.4375	14.357

14.357

520625

371875

223125

297500

74375

106.7801875

l.

4.875 | 106.7801875 | 21.9036

9750

9280

4875

44051

43875

17687

14625

30625

29250

1375

Anſwer, 21 *l.* 18 *s.* 0 *d.* $\frac{8}{9}$

If 4.5 Yards of Camblet coſt .875 *l.* What will 124.7625 Yards coſt?

Yds.	*L.*	*Yds.*
If 4.5	875	124.7625
		.875

6238125
8733375
9981000

4.5 } .5 | 109.1671875 |

9 | 218.334375

L. 24.259395 Anſw. *l.* 24 *s.* 5 *d.* 2 $\frac{1}{4}$

I divided this by the Ratio's of 4.5, and prickt the 5 as a Decimal; and if I had divided by the 9 firſt, and prickt it as a Decimal, it wou'd have been the ſame in the Anſwer.

If 13.333 *l.* in .75 of a Year gain 1.0833 *l.* What will 50 *l.* gain in 5 Months?

Observe the same Method as in Whole Numbers, and say,

L.	*Y.*	*L.*	*L.*	*Years*
If 13.333	.75	1.0833	50	.4166
.75		.4166		

66665
93331
9.99975

64998
64998
10833
43332

.45130278
50

l.
9.99975 | 22.56513900 | 2.256
1999950

2565639
1999950

5656890
4999875

6570150
5999950

570200

l. s. d.
Answer 2 5 1 ½

This is the Proof to the first Question in the *Double Rule of Three* of *Vulgar Fractions*, and by this Method you may proceed in any other.

But I shall end this.

The

The Rule of Barter in Decimals.

TWO Merchants *Barter*, *A.* hath C. qr. lb. 4 1 24 of Sugar, at 1 *l.* 7 *s.* 6 *d.* ℔ Hundred; *B.* hath Wool Hats, at 2 *s.* 3 *d.* ℔ Hat; I demand how many Hats *B.* muſt give *A.* for his Sugar?

First ſay, If C. 1 *L.* 1.375 C. 4.464

1.375
22320
3 1248
13392
4464

L. 7.038 0 00 Anſwer 7 *l.* 0 *s.* 9 *d.* for the Value of A's Sugar.

Then ſay, If *l.* .1125 *Hat.* 1 *l.* 7.038

1

.1125 | 7.038000 | 62.56 Hats.
6750
2880
2250
6300
5625
6750
6750
0

Anſwer, 62 Hats *B.* muſt give *A* for his Sugar, and about 15 *d.* in Money.

Then ſay for a Proof.

Hat. *l.* *Hats.*
If 1 .1125 62.56
1125
31280
12512
6256
6256

L. 7.038000 Anſwer, 7 *l.* 0 *s.* 9 *d.* *B's* Hats coſt, as well as *A's* Sugar, and is a ſure Proof.

Two Merchants Barter, *A.* hath 420.5 *lb.* of Indico, at 2 *s.* 6 *d.* ℔ Pound; *B.* hath Cheque Pieces, at 1.025 *l.* ℔; The Queſtion is, How many Cheque Pieces *B.* muſt give *A.* for his Indico?

lb. *l.* *lb.*

Firſt ſay, If 1 .125 420.5

.125

21025
8410
8205

L. 92.5625

Anſwer, 92 *l.* 11 *s.* 3 *d.* A's Indico comes to.

l. *Ch.* *l.*

Then ſay, If 1.025 1 92.5625

1

Cheque Pieces.

1.025 | 92.5625 | 90.304877

9225

3125
3075

5000
4100

9000
8200

8000
7175

8250
7175

1075

Then ſay,

Ch. *l.* *Cheques.*

If 1 1.025 90.3048

1.025

4515240
1806096
9030480

L. 92.56242 Anſw. as before.

Anſwer, B. muſt give A. 90.3048 Cheques for A's Indico.

Two

Two Merchants, A. and B. Barter, A. hath 96 Yards of Broad Cloth, at 8 *s.* 6 *d.* ℔ Yard, ready Money, but in Barter he will have 10 *s.* 6 *d.* B. hath Cotton-Wool, at 1 *s.* 3 *d.* ℔ Pound; the Queſtion is, how many Pounds of Cotton B. muſt give A. for his Broad-Cloth, making his Gain in Barter equal to that of A's.

Yd.	*l.*	*Yds.*
If 1	.525	96
	96	
	3150	
	4725	
	50.400	A's Broad-Cloth comes to.

l.	*l.*	*l.*
If .4375	.525	.0625
		.525
		3125
		1250
		3125 *l.*

l.	*lb.*	*l.*
If .075	1	50.4
		1
.075	50.400	672 *lb.* Cotton
	450	B. muſt give A.
	540	for his Broad-Cloth.
	525	
	150	
	150	
	0	

lb.	*l.*	*lb.*
Then ſay, If 672	50.4	1
		1
672	50.40	.075 Anſwer, 1 *s.* 6 *d.*
	4704	as before.
	3360	
	3360	
	0	

.4375	.0328125	.075
	30615	
	21975	
	21875	
	100	

Get Maſter of theſe three Queſtions, and you may work any Queſtion in the Rule of *Barter*.

TWO Men join Stocks, A. put in 20.5 *l.* B. put in 40.75 *l.* And they by Trading gained 50.25 *l.* What belongs to either?

l. *l.* *l.*
If 61.25 50.25 20.5

20.5

25125
100500

61.25 | 1030.1250 | 16.81 for A's Part.
6125

41762
36750

50125
49000

11250
6125

5125

A's Stock, 20.5
B's Stock, 40.75
Total, 61.25

If 61.25 50.25 40.75

40.75

25125
35175
201000

61.25 | 2047.6875 | 33.43 *l.* for B's part.
18375

21018
18375

26437
24500

19375
18375

1000

Answer { A. } gains { 16.81 / B. } { 33.43

Answer, *L.* 50.24

Hence I say it is evident, that working by Decimals will loose, as this has lost 100 Part of a Farthing; but still the Remainders will make it just.

A

A Grocer breaking owes unto 4 Men the following Sums of Money; when his Goods, Wares, and Merchandizes were sold they did but amount to 62 *l.* 18 *s.* 6 *d.* besides they employed an Attorney for them, whose Suit-Charges came to 8 *l.* 2 *s.* 6 *d.*

To	*l.*	*s.*	*d.*
A.	24	4	6
B.	28	5	6
C.	35	15	4
D.	48	14	8
	137	00	0

Now I desire to know how much each Man must have of the same, and what it will be ℔ Pound when the Attorney-Charges are deducted out of the Amount of his Effects.

If	*l.*	*l.*	*l.*		*l.*	*s.*	*d.*
	137	54.8	1	His Goods made	62	18	6
		1		The Attorney-Charges	8	02	6
	137	54 8	.4 ℔ *l.*	His neat Effects	54	16	0
		548					
		0	or 8 Shillings.				

Now observe this .4 is a common Multiplicator for each Man's Money.

	l.		*l.*		*l.*		*l.*
A's	24.225	B's	28.275	C's	35.7666	D's	48.7333
	.4		.4		.4		.4
	l. 9.6900		*l.* 11.3100		*l.* 14.30664		*l.* 19 49332

Answer { A. / B. / C. / D. } must have { 9.69 / 11.31 / 14.3066 / 19.4933 } for his Share.

Proof, *L.* 54.7999

And so of any other of this Kind.

Two

Two Men make a Joint Stock for 12 Months, A. puts in 24.875 *l.* B. put in 96.225 *l.* and at the End they make a Dividend of 48.5 *l.* which they have gained, What belongs to either Man of the ſame?

	l.		*l.*
A.	24.875	Multiplied by his Time,	298.500
B.	96.225	*viz.* 12 Mon. produces	1154.700

Stocks and Time, *L.* 1453.2

l.	*l.*	*l.*		*l.*	*l.*	*l.*
If 1453.2	48.5	298.5	If 1453.2	48.5	11547	
		48.5			48.5	
		14925			57735	
		23880			92376	
		11940			46188	
1453.2	14477.25	*l.* 9.962	1453.2	56002.9500	*l.* 38.537	
	130788			43596		
	139845			124069		
	130788			116256		
	90570			78135		
	87192			72660		
	33780			54750		
	29064			43596		
	4716			111540		
				101724		
				9816		

	L.	
A. gains	9.962	For his Share.
B. gains	38.537	

Anſwer, *L.* 48.499 and Proof.

And ſo of any other.

Loſs

Loſs and Gain in Decimals.

IF I buy Broad-Cloth at 10 *s.* 9 *d.* ℔ Yard, how muſt I ſell it to gain 20 Pounds ℔ *Cent.*

l. *l.* *l.*
If 100 120 .5375
120
L. .645000

I prick off 2 Figures more than the Decimals inſtead of dividing by 100,

Anſwer, 12 *s.* 10 *d.* ¾ ℔ Yard, to be ſold at.

If I buy One Hundred Weight of Pepper for 5 *l.* 10 *s.* and ſell it again for 1 *s.* 3 *d.* ℔ Pound, whether do I gain or looſe, and how much ℔ *Cent.*

Firſt find what 112 *lb.* comes to, at 1 *s.* 3 *d.* ℔ Pound.

lb. *l.* *lb.*
If 1 .0625 112
112
1250
625
625
L. 7.0000

l. *l.* *l.*
If 5.5 7 100
7
l.
5.5 | 7000 | 127.2727
55
150
110
400
385
150
110
400 *ad Infin.*

l.
Sold for 127.2727
100

Anſw. *L.* 27.2727 gained ℔ *Cent.*

Equal to 27 *l.* 5 *s.* 5 *d.* ¼

A Mer-

A Merchant in *Preſton* bought Yarn at 6 Shillings the Bundle, which not proving ſo good as was expected, was mindful to ſell them ſo as to looſe 8 Pounds *℔ Cent.* What muſt a Bundle be ſold at?

	l.	*l.*	*l.*
If	100	92	.3
		.3	

L. .276 Anſwer, 5 *s.* 6 *d.* ¼ *℔* Bundle.

A *Blackburn* Merchant going to a Market ſold Cheques at 17 *s.* 6 *d.* *℔* End, wherein was gained 12 Pounds *℔ Cent.* and finding no other Merchant had ſo good raiſeth them at the latter End of the Fair to 1 *l.* *℔* End; I demand what was gained *℔ Cent.* by this laſt Sale?

	l.	*l.*	*l.*
If	.875	12	1
		1	

.875	12.000	*L.* 13.7142
	875	
	3250	
	2625	
	6250	
	6125	
	1250	
	875	
	3750	
	3500	
	2500	
	1750	
	750	

Anſwer, The latter Sale gained 13 *l.* 14 *s.* 3 *d.* ¼ *℔ Cent.*

If I buy Cotton at 1 *s.* ℔ Pound, and ſell it again at 1 *s.* 3 *d.* ℔ Pound, and allow 3 Months for Payment, What do I gain ℔ *Cent.* ℔ *Annum*, after 6 *l.* ℔ *Cent.* ℔ *Annum*?

l. *l.* *M. L. Mon.*

First, If .05 .0625 100 If 12 6 3 Rebate.

100 3

.05 | 6.2500 12 | 18

L. 125 Gain. *L.* 1.5

l. *l.* *l.*

Then ſay, If 101.5 1.5 125

1.5

l

101.5 | 187.5 | 1.847

1015

8600

8120

4800

4060

7400

7105

l. 295

Thus, 125

Rebated 1.847

l. *s.* *d.*

L. 123.152 Anſwer, 123. 3 0½ to be paid in Hand.

And ſo of any other.

WHAT's the *Rebate* of 56.5 for 9 Months, at 6 *l.* ℔ *Cent.* ℔ *Annum.*

Obſerve the very ſame Method as in Whole Numbers, and ſay,

M. *L.* *M.*
If 12 6 9 Then ſay, If 104.5 4.5 56.5

9

12 | 54

L. 4.5

l. *l.* *l.*
104.5 | 254.25 | 2.433

l.
Given Sum, 56.5
Rebate, 2.433
To be paid in Hand, *l.* 54.067
Or, 54 *l.* 1 *s.* 4 *d.*

56.5
2825
2260
2090
4525
4180
3450
3135
3150
3135
15

What's the Rebate of 765.625 for 14 Months, at 6 *l.* ℔ *Cent.* ℔ *Annum?*

Mo. *L.* *Mon.* *l.* *l.* *l.*
If 12 6 14 If 107. .7 765.625

6

7

12 | 84

L. .7

L.
107. | 5359.375 | 50.0876

535

937
856
815
749
660
642
18

l.
Given Sum, 765.625
Rebated, 50.087
To be paid in Hand, *l.* 715.538

What's the Rebate of 250 *l.* the one Half to be paid at 3 Months, and the other Half at 6 Months, at 5 *l.* *℔* Cent *℔* *Annum*?

M.	*L.*	*M.*
If 12	5	3
		3
12	15	

L. 1.25

M.	*L.*	*Mon.*
If 12	5	6
		6
12	30	2.5

l.	*l.*	*l.*
If 102.5	2.5	125
		2.5
		625
		250

	l.
102.5	3.0487
3075	
5000	
4100	
9000	
8200	
8000	
7175	
825	

l.	*l.*	*l.*
If 101.25	1.25	125
		125
		625
		250
		125

	l.	
101.25	156.25	1.543
	10125	
	55000	
	50625	
	43750	
	40500	
	32500	
	30375	
	2125	

l.
$\frac{1}{2}$ | 250
L. 125

	l.
Given Sum	250
1ſt Rebate	1.543
2d Rebate	3.0487
Whole Rebate	4.5917
To be paid in Hand,	245.4083

Equation of Payments in Decimals

ADMIT, I have a certain Sum of Money owing me, to be paid at 4 ſeveral Payments, *viz.* 12.5 *l.* at 4 Months, and 16.25 *l.* at 6 Months, and 21.75 *l.* at 9 Months, and 30.5 *l.* at 12 Months; the Queſtion is, at what Time the Whole ought to be paid without Damage to either Party?

l.				*l.*	
12.5		4		50.0	
16.25	Multiplied	6	is	97.50	Produces.
21.75	by	9		195.75	
30.5		12		366.0	

			Months.
L. 81.00	81	709.25	8.75619
		648	4
		612	3.02476
		567	7
The Money all muſt be paid		455	.17332
at the End of 8 Months, 3		405	24
Weeks, 0 Day, 4 Hours, &c.			
But now I think I am over		500	69328
curious, for if I had run it as		486	34664
far as Weeks it had been			
ſufficient.		140	4.05968
		81	
		790	
		729	
And ſo of any other.		61	

Simple

Simple Intereſt in Decimals.

SIMPLE INTEREST is that which is paid for the Hire or Loan of any Principal or Sum of Money lent out for ſome Time, at any Rate *℔ Cent.* agreed on between the Borrower and the Lender; which, according to the Laws of *England*, by an Act of Parliament in that Caſe made and provided, is 5 *l.* for one Year, for the Uſe of 100 *l.* And ſo on for a greater or leſſer Sum, proportionable to the Time propoſed.

In reſolving Queſtions of *Simple Intereſt*, Four Things ought to be conſidered.

1. The Principal or Money lent.
2. The Time for which it is lent.
3. The Rate or Intereſt.
4. The Amount at the Time end.

Any Three of theſe being given to find the Fourth.

1*ſt.* Principal Time and Rate being given to find the Amount.

RULE.

To the Product of the Rate multiplied by the Time, add One before the ſaid Number: That Sum multiplied by the Principal gives the Amount.

What will 30 Pounds amount to, forborn 8 Years, at 5 *l. ℔ Cent. Simple Intereſt.*

Principal 30 *l.* Rate .05 *l.* Time 8 Years.

Rate	.05
Time	8
	1.40
Principal	30
L.	42.00 The Amount.

What will 40 *l.* amount to, lent to Intereſt, from *Auguſt* 1ſt, 1750, until *May* 29th next following, at 5 *℔ Cent. ℔ Annum*, Simple Intereſt?

Find the Time thus.

Auguſt	31
Septem.	30
Octob.	31
Novem.	30
Decem.	31
January	31
Febr.	28
March	31
April	30
May	28
Days	301

365 | 301.0000 | .8246 Time.
.05 Rate.

1.041230
49

L. 41.649200

Anſwer 41 *l.* 12 *s.* 11 *d.* ¼

2*d.* The Amount, Rate, and Time being given to find the Principal.

RULE.

To the Rate multiplied by the Time, add Unity, by which Divide the Amount, and you will have the Principal.

What preſent Money will pay a Debt of 42 *l.* due eight Years hence, at 5 *l. ℔ Cent.* Simple Intereſt?

Rate .05
8

1.40 | 42.00 | 30 *l.* Anſwer.
420

0

3*d.* Principal

3d. Principal Amount and Rate given to find the Time.

RULE.

From the Amount ſubtract the Principal, the Difference divided by the Product of the Principal and Rate, gives the Time.

In what Time will 30 *l.* amount to 42 *l.* at 5 *l.* *per Cent.* Simple Intereſt.

Principal	30	Amount	42
Rate	.05	Principal	30
Product	1.50	1.50 | 1200	8 Years the Time.
		1200	
		0	

4th. Principal Time and Amount given to find the Rate.

RULE.

From the Amount ſubtract the Principal, the Remainder divided by the Product of the Principal and Time gives the Rate.

At what Rate of Simple Intereſt will 30 *l.* amount to 42 *l.* in 8 Years?

Principal	30	42	Amount.
Time	8	30	Principal.
	240	240 | 12.00	.05 Rate required.
		1200	
		0	

The

The following TABLE *shews the Amount and Rebate of* 1 *l. for* 30 *Years, at* 5 *l.* ℔ Cent.

Years	*Amount, at* 5 *per.*	*Rebate, at* 5 *per.*
1	1.05	.95238
2	1.1	.909091
3	1.15	.869565
4	1.2	.833333
5	1.25	.8
6	1.3	.76923
7	1.35	.74074
8	1.4	.714285
9	1.45	.689655
10	1.5	.666666
11	1.55	.645161
12	1.6	.625
13	1.65	.60606
14	1.7	.588235
15	1.75	.571428
16	1.8	.555555
17	1.85	.54054
18	1.9	.526315
19	1.95	.51282
20	2.	.5
21	2.05	.487804
22	2.1	.47619
23	2.15	.465116
24	2.2	.454545
25	2.25	.444444
26	2.3	.434781
27	2.35	.425532
28	2.4	.416666
29	2.45	.408163
30	2.5	.4

The Proportion of this TABLE runs thus, As 1 is to the Tabular Number, ſo is the Sum of Money, to the Anſwer required.

And ſeeing the firſt Number is an Unit, you have the Anſwer by multiplying only.

What will 30 *l.* amount to, forborn 8 Years, at 5 ℔ *Cent.* Simple Intereſt?

Tabular N°. anſwering 8 Years is 1.4

Mul. 30

L. 42.0 Anſwer.

What ready Money will pay a Debt of 42 *l.* due 8 Years hence, at 5 ℔ *Cent.*

Tabular N°. anſwering 8 Years. .714285

42

1428570

I call it 30 *l.* for it does only want 300,000 Part of one Farthing. 2857140

L. 30.000000

Any

Any Queſtion of the following Nature may be reſolved if the Time given be even Years, but if not, uſe the foregoing Rules.

What ready Money will pay a Debt of 40 *l.* 10 *s.* 6 *d.* due 5 Years hence: Rebate being allowed at 5 *l.* *per Cent.* Simple Intereſt?

Tabular N°. againſt 5 Years, .8

40.625

L. 32.5000

Anſwer, 32 *l.* 10 *s.* 0 *d.*

If your Queſtion be, concerning Annual Rents, Payments, or Annuities, to be bought or ſold for ſome Time, then conſider it under theſe four Particulars.

1. The Annuity or Penſion.
2. The Time of Continuance.
3. The Rate of Intereſt.
4. The preſent Worth.

Any Three of theſe being given to find the Fourth.

1*ſt*. Annuity, Rate, and Time given to find the preſent Worth.

RULE.

To the Square of the Time multiplied by the Rate add the Double of the Time, from which ſubtract the Rate multiplied by the Time, the Remainder multiplied by the Annuity, and that Product divided by the Double of the Rate multiplied by the Time, made more by 2, the Quotient is the preſent Worth.

What's an Annuity of 30 *l.* ℔ *Annum*, clear Value, to be ſold for 8 Years, worth in ready Money, Simple Intereſt, at 5 ℔ *Cent.*

Square of the Time	64		18.8 Remainder.		8 Time.
Mul. by Rate	.05		30 Annuity.		.05
	3.20	2.8 | 564.0			.40
Double of the Time	16				2
	19.20	*L.* 201.4285			.80
Rate by the Time	.40				
Remainder,	18.80	Anſwer, 201 *l.* 8 *s.* 7 *d. fere.*			

2*d.* Preſent Worth, Time, and Rate given to find the Annuity.

RULE.

Multiply the Double of the Rate, multiplied by the Time, made more by 2, by the preſent Worth; that Product divided by the Square of the Time multiplied by the Rate, made more by the Double of the Time, made leſs by the Rate multiplied by the Time, the Quotient is the Annuity.

What Annuity, to continue 8 Years, at 5 ℔ *Cent.* Simple Intereſt, will 30 *l.* purchaſe?

Double of the Rate	.10	Square of the Time	64
Time	8	Rate	.05
	2.80		3.20
Preſent Worth	30	Double of the Time	16.
	19.2 | 84.00		19.20
L. 4.375	Anſwer, 4 *l.* 7 *s.* 6 *d.*		

3*d.* Annuity,

3d. Annuity, preſent Worth, and Time given to find the Rate.

RULE.

The Product of the Annuity and Time made leſs by the preſent Worth, being multiplied by 2, and divided by the Sum of Double the preſent Worth, multiplied by the Time made more by the Annuity multiplied by the Time, made leſs by the Annuity multiplied by the Square of the Time, the Quotient is the Rate.

L

At what Rate of Simple Intereſt will 201.4285 purchaſe an Annuity of 30 *l.* to continue 8 Years?

	201.4285		30 Annuity.
	2		8 Time.
Doubled,	402.8570	64	240
Time,	8	30	201 4285
	3222.8560	1920	38.5715
Time and Stock	240		2
	3462.8560	1542.856	77.14300 | .05 Rate.
	1920.		7714280
	1542.8560		Anſwer, 5 *per Cent.*

4th. Annuity, Rate, and preſent Worth given to find the Time of Continuance.

To the doubled Product of the preſent Worth multiplied by the Rate, add the Product of the Annuity multiplied by the Rate, the Square of the Difference betwixt this Sum, and Double the Annuity added to the Octuple Product of the preſent Worth: Annuity and Rate multiplied one into another, the Square Root of this laſt Sum added or ſubtracted to or from the former Difference, according as the former Sum was greater or leſs than the latter, this laſt Sum or Difference divided by Double the Annuity multiplied by the Rate, quotes the Time ſought.

In what Time will 5 *l.* *per Annum* pay a Debt of 110 *l.* 10 *s.* at 5 *per Cent.* Simple Intereſt?

Annuity 5 *l.* Rate .05 *l.* preſent Worth 110 *l.* 10 *s.*

Preſent Worth,	110.5	Annuity 5	Double Annuity 10
Rate,	.05	Rate .05	Rate .05
	5.525	.25	.50
Mul. by	2		
	11.050		*L.*
Annuity and Rate,	.25	Preſent Worth	110.5
		Rate	.05
	11.300 — 1ſt. Sum.		5.525
Double Annuity,	10. — 2d. Sum.	Annuity	5
	1.3 Difference.		27.625
	1.3		8
	39	Octuple Product	221.000
	13		
	1.69		
	221.		
	222.69	14.9224 *fere.*	
	1	1.3 Difference.	
24	122	.5 | 16.2224	
	96		
		32.4448	
288	2669		
	2602		
2982	6700		
	5984		
29842	71600	Anſwer, 32.4448 Years.	
	59684		
29844	1191600		

5*th.* To

5th. To the foregoing Rules I ſhall add a Fifth, which is by halving the Annuity, Time, and Rate given to find the Amount.

RULE.

From the given Number of Years ſubtract an Unit, Half of the Remainder multiplied by the Product of the Rate and Time, and to this Product adding the Number of Years given, the Sum multiplied by the Annuity gives the Amount.

An Annuity of 30*l.* *℔ Annum* is forborn 8 Years, what will then be due at 5 *℔ Cent.* Simple Intereſt?

8 made leſs by 1 equal $\frac{1}{2}$ 7

3.5

Rate .05
Time 8
.40

Rate by Time .40
3.5
1.400
add Time 8
9.400
30
L. 282.000 Anſwer.

A Grocer binds his Son an Apprentice for 7 Years, and at the ſame Time lets an Annuity of 45*l.* 10*s.* run to the Expiration of the ſaid Term, that it may be a Stock for his Son. The Queſtion is, what this Stock will amount to, accounting Simple Intereſt at 5 *℔ Cent.*

7
1
$\frac{1}{2}$ 6
3

7
.05
.35
3
1.05
7
8.05

45.5
8.05
2275
36400
L. 366.275 Anſwer, 366*l.* 5*s.* 6*d.*

The firſt, ſecond, and fifth Rules being of moſt common Uſe, I have annexed *Tables* fitted thereto, at 5 *℔ Cent.* whereby the Anſwer may be found at one ſingle Operation, as in the Uſe of them may be ſeen.

Years.

Years	The Amount of 1l. per Ann. for 30 Years, at 5 per Cent. Simple Interest.	The present Worth of 1 l. Annuities for 30 Years, at 5 per Cent. Simple Interest.	The Annuity that 1l. will purchase for 30 Years, at 5 per Cent. Simple Interest.
1	1.00	0.952386	1.05
2	1.05	1.863636	.536585
3	3.15	2.73913	.365079
4	4.3	3.583333	.279069
5	5.5	4.4	.227272
6	6.75	5.192307	.192607
7	8.05	5.962962	.167702
8	9.4	6.714285	.145833
9	10.8	7.448275	.134259
10	12.25	8.166666	.122041
11	13.75	8.870967	.114545
12	15.3	8.9625	.104575
13	16.9	10.242424	.097633
14	18.5	10.911764	.091644
15	19.25	11.571428	.08642
16	22.	12.222222	.081818
17	23.8	12.864864	.077731
18	25.65	13.5	.074074
19	27.55	14.128205	.07078
20	29.5	14.75	.068644
21	31.5	15.365853	.065079
22	33.55	15.97619	.062593
23	35.65	16.581393	.060308
24	37.8	17.181818	.058201
25	40.	17.777777	.056255
26	42 25	18.369565	.054438
27	44.55	18.957447	.052749
28	46.9	19.541666	.051172
29	49.3	20.122449	.049695
30	51.75	20.7	.048309

The Uſe of the foregoing Tables.

In the Uſe of the Second Table.

Ex. There is an Annuity of 30 *l.* *per Annum*, to continue for 8 Years, to be ſold for ready Money, What is the Value thereof, allowing Simple Intereſt at 5 *per Cent.*

Tabular Number anſwering 8 Years, and 5 *per Cent.* in the ſecond Table is,

6.714285

Mul. by 30 Anſwer, 201 *l.* 8 *s.* 7 *d. fere.*

L. 201.428550 Anſwer, which agrees with the firſt Propoſition of Annual Rents, *&c.* intitled, and becauſe theſe are but Proofs of the former, I ſhall not ſtay long on them, for I am but doing what is already done.

The Uſe of the Third Table.

What Annuity, to continue 8 Years, will 30 Pounds purchaſe, at 5 *per Cent.* Simple Intereſt?

Tabular Number againſt 8 Years, and under 5 *per Cent.* in the Third Table is,

.145833

30

L. 4.374990

Which agrees with the ſecond Propoſition, and is equal to 4 *l.* 7 *s.* 6 *d.* the Annuity required.

The

The Uſe of the Firſt Table.

An Annuity of 30 *l.* *℔ Annum* is forborn 8 Years; What will be then due at 5 *℔ Cent.* Simple Intereſt?

Tabular Number anſwering 8 Years, and under 5 *℔ Cent.* in the firſt Table is,

9.4
30

L. 282.0 Anſwer, due.

A Nobleman bequeathed 2500 Pounds to his Daughter to be paid her at 12 Years End. The Executors deſire to pay ready Money, ſo they may be abated after the Rate of 5 *℔ Cent.* Simple Intereſt: The Queſtion is, what ready Money will pay this Legacy, and what the Executors will gain by their Office?

Seek in the ſecond Table, and in the former Tables, for the Number over againſt 12 Years, at 5 *℔ Cent.* Rebate, and you'll ſee

.625
2500

3125
1250

L. 1562.500 Anſw. will pay the Legacy.

Then 2500 bequeathed.
1562.5 To be paid.

L. 937.5 Anſw. 937 *l.* 10 *s.* for the Executors Office.

A Mer-

A Merchant is indebted 560 *l.* the Creditor is contented to receive the ſame at 8 equal yearly Payments, the Debtor allowing for the Forbearance of the ſame Money after the Rate of 5 *l.* *℔ Cent.* Simple Intereſt. The Queſtion is, what thoſe yearly Payments ought to be?

In the latter Tables againſt 8 at 5 *℔ Cent.* and 3d. Table, you will find

.145833
560
8749980
729165
81.666480 Anſwer, *l.* 81 *s.* 13 *d.* 4

A Gentleman hath 160 *l.* which he would lay out to purchaſe 20 *l.* *℔ Annum:* How many Years muſt the ſaid Annuity continue, Simple Intereſt being computed at 5 *℔ Cent.*

Divide 160 by 20, quotes 8, which ſhews he gives 8 Years Value for the ſaid Annuity.

Seek in the latter Tables, and under 5 *℔ Cent.* the Number 8, but not finding it I look the next leſs, which is 7.448275, and over againſt it is 9 Years, which ſhews it muſt continue ſomewhat above 9 Years, and to find what, ſay; As the Difference betwixt this and the next bigger Number, *viz.* (8.166666) 7.448275 Difference .718391 : To 1, ſo is the Difference of the ſaid next leſs and 8 (*viz.*) .73399 to 102 Parts of a Year equal to 9 *Years*, 1 *Month*, 1 *Week*, 2 *Days*, &c. accounting 13 Months to the Year.

COMPOUND INTEREST is that which ariſes from any Principal, and its Intereſt put together, ſtill becomes due, ſo that at every Payment, or at the Time when the Payments becomes due, there is made a new Principal; and for that Reaſon it is called *Intereſt upon Intereſt*, or *Compound Intereſt*.

Tho' it be not lawful to let out Money at *Compound Intereſt*; yet, in purchaſing Annuities or Penſions, and taking Leaſes in Reverſion, and ſuch like, it is uſual to allow *Compound Intereſt* to the Purchaſer for his ready Money, and therefore it is very requiſite to underſtand it.

Principal, Rate, and Time given to find the Amount.

RULE. Multiply the Principal given by 100, and the Rate of Intereſt added together: And inſtead of Dividing by 100, prick off two Figures more than is required by the Decimal Parts given, (if there be any) if none, prick only two off for the firſt Year, four for the ſecond Year, *&c.*

What will 40 *l.* amount to in 3 Years, at 5 *℔ Cent. ℔ Annum*, Compound Intereſt?

You may ſtate thus, tho' you need not to divide.

l. *l.* *l.*

If 100 105 40

105

First Year, *l.* 42 00 or 42 *l.*

105

210

420

2d. Year, *l.* 44.10 or 42 *l.* 2 *s.*

105

2205

4410

3d. Year, *l.* 46.305 or 42 *l.* 6 *s.* 1 *d.* $\frac{1}{4}$ *fere.*

You ſee I neglect the Cyphers in *Decimals*.

Or thus,

	l.	*s.*	*d.*
1ſt. Principal,	40	0	0
Intereſt,	2	0	0
Amount 2d. Principal,	42	0	0
Intereſt,	2	2	0
Amount 3d. Principal,	44	2	0
	2	4	$1\frac{1}{4}$
Amount as before, *l.*	46	6	$1\frac{1}{4}$

When

When it is required to find the preſent Worth of any Sum of Money due at the End of any Number of Years yet to come, Intereſt diſcounted at any Rate *℔ Cent. ℔ Annum.*

Amount, Rate, and Time given to find the preſent Worth.

RULE. Divide the Amount given by 100 and the Rate of Intereſt added to it, and that Quotient by the ſame, and ſo on according to the Number of Years required, and the laſt Quotient is the preſent Worth required.

What's the preſent Worth of *l.* 46.305 due at the End of three Years, Intereſt Diſcounted at 5 *℔ Cent. ℔ Annum?*

	105	105	*L.*
105 | 46.305	44.10	42.00	40 Preſent Worth.
420	420	420	
430	210	00	
420	210		
105	0		
105			
0			

Or thus,

l.	46	6	$1\frac{1}{4}$
Int. of 44 *l.* 2 *s.*	2	4	$1\frac{1}{4}$
l.	44	2	0
Intereſt of 42 *l.*	2	2	0
	42	0	0
Intereſt of 40 *l.*	2	0	0
Preſent Worth, *l.*	40	0	0

I might make Tables to find the Amount and Rebate of any Sum of Money for any Number of Years required, or work by *Logarithms*, but ſuch Things wou'd ſwell the Book larger than I cou'd afford it at the Price fix'd: So I ſhall content myſelf in anſwering one Quere, which is very uſeful after the Method I make uſe on for that Occaſion.

Admit there was 100 *l.* laid down on a certain Piece of Land or Tenement, on the 1ſt Day of *May*, 1751, whoſe clear yearly Value was 16 *l.* *℔ Annum*; How long muſt the Mortgagee receive the yearly Rent of 16 *l.* to make him Satisfaction for his 100 *l.* at 5 *℔ Cent. ℔ Annum*, Compound Intereſt?

	l.	*s.*	*d.*
May 1ſt, 1751, Principal Money, -	100	0	0
Intereſt for the Year at 5 *℔ Cent.*	5	0	0
Principal and Intereſt at the Year End,	105	0	0
The Annual Rent to be deducted is,	16	0	0
May 1ſt, 1752, Principal Money, -	89	0	0
Intereſt for the Year at 5 *℔ Cent.* -	4	9	0
Principal and Intereſt at the Year End,	93	9	0
The Annual Rent to be deducted is,	16	0	0
May 1ſt, 1753, Principal Money, -	77	9	0
Intereſt for the Year at 5 *℔ Cent.* -	3	17	5
Principal and Intereſt at the Year End,	81	6	5
The Annual Rent to be deducted is,	16	0	0
May 1ſt, 1754, Principal Money, -	65	6	5
Intereſt for the Year at 5 *℔ Cent.* -	3	5	4
Principal and Intereſt at the Year End,	68	11	9
The Annual Rent to be deducted is,	16	0	0
May 1ſt 1755, Principal Money, -	52	11	9
Intereſt for the Year at 5 *℔ Cent.* -	2	12	7
Principal and Intereſt at the Year End,	55	4	4
The Annual Rent to be deducted is,	16	0	0
May 1ſt, 1756, Principal Money, -	39	4	4

Brought

	l.	*s.*	*d.*
Brought over,			
May 1st, 1756, Principal Money, -	39	4	4
Intereſt for the Year at 5 *per Cent.* -	1	19	3
Principal and Intereſt at the Year End,	41	3	7
The Annual Rent to be deducted is,	16	0	0
May 1st, 1757, Principal Money, -	25	3	7
Intereſt for the Year at 5 *per Cent.* -	1	5	2
Principal and Intereſt at the Year End,	26	8	9
The Annual Rent to be deducted is,	16	0	0
May 1st, 1758, Principal Money, -	10	8	9
Intereſt for the Year at 5 *per Cent.* -		10	5
Principal and Intereſt at the Year End,	10	19	2

So you ſee the Mortgagee muſt hold the Premiſſes the Term of 8 Years for his 100 *l.* laid down, and muſt pay the Mortgager the Sum of 5 *l.* 0 *s.* 10 *d.* and the whole Debt is diſcharged.

The

The Rules of Practice in Decimals.

A TABLE, shewing by Inspection the Decimal Parts of a Pound Sterling, from the Fourth of a Farthing to Twenty Shillings, or one Pound Sterling; making one Pound Sterling the Integer.

Value	Decimals	Val.	Decimals	Value	Decimals
$\frac{1}{4}$	.00026041				
$\frac{1}{2}$	.00052083	5 -	.020833	10 -	.041666
1	.0010416	1	.021853	1	.042708
2	.0020833	2	.022875	2	.04375
3	.003125	3	.023956	3	.044791
1 d. -	.004166	6 -	.025	11 -	.045833
1	.0050208	1	.026041	1	.046875
2	.00625	2	.027083	2	.047916
3	.007391	3	.028512	3	.048958
2 d. -	.008333	7 -	.029166	1 s. -	.05
1	.009375	1	.030208	1	.051041
2	.010416	2	.031292	2	.052083
3	.011437	3	.032291	3	.053114
3 -	.0125	8 -	.033333	1 1 -	.054166
1	.01352	1	.034375	1	.055208
2	.014583	2	.035416	2	.05625
3	.015416	3	.036458	3	.057291
4 -	.016666	9 -	.0375	1 2 -	.058333
1	.017708	1	.038516	1	.059375
2	.01875	2	.039583	2	.060416
3	.019791	3	.040625	3	.061458

Val.	Decimals	Val.	Decimals	Val.	Decimals
l 3	.0625	l 11	.095833	2 7	.129166
1	.063541	1	.096875	1	.130208
2	.064583	2	.097543	2	.13125
3	.065625	3	.098958	3	.132283
l 4	.066666	2 0	.1	2 8	.133333
1	.067713	1	.10125	1	.134375
2	.06875	2	.1025	2	.135416
3	.0697916	3	.10375	3	.136458
l 5	.070833	2 1	.104166	2 9	.1375
1	.071875	1	.105208	1	.138544
2	.072916	2	.10625	2	.139583
3	.073958	3	.107291	3	.140625
l 6	.075	2 2	.108333	2 10	.141666
1	.076006	1	.109375	1	.142703
2	.077083	2	.110936	2	.14375
3	.078145	3	.111458	3	.144791
l 7	.079166	2 3	.1125	2 11	.145833
1	.080283	1	.113541	1	.146458
2	.08125	2	.114583	2	.147916
3	.082291	3	.115625	3	.148958
l 8	.083333	2 4	.116666	3 0	.15
1	.084375	1	.117708	1	.151041
2	.085416	2	.11875	2	.152083
3	.086458	3	.119791	3	.153125
l 9	.0875	2 5	.120833	3 1	.154166
1	.088541	1	.121875	1	.155208
2	.089583	2	.122916	2	.15625
3	.090625	3	.123956	3	.157281
l 10	.091666	2 6	.125	3 2	.158333
1	.092708	1	.126041	1	.159291
2	.09375	2	.127083	2	.160416
3	.094791	3	.128125	3	.161458

Val.	Decimals
3 3	.1625
1	.163541
2	.164583
3	.165625
3 4	.166666
1	.167708
2	.16875
3	.169791
3 5	.170833
1	.171875
2	.172916
3	.173958
3 6	.175
1	.176041
2	.177083
3	.178125
3 7	.179166
1	.180208
2	.18125
3	.182291
3 8	.183333
1	.18435
2	.185416
3	.186408
3 9	.1875
1	.188541
2	.189583
3	.190625
3 10	.191666
1	.192708
2	.19325
3	.19479
3 11	.195833
1	.196875
2	.197908
3	.198958
4 0	.2
1	.201041
2	.202083
3	.203125
4 1	.204166
1	.205208
2	.20625
3	.207281
4 2	.208333
1	.209291
2	.210416
3	.211458
4 3	.2125
1	.213541
2	.214583
3	.215625
4 4	.216666
1	.217708
2	.21875
3	.219791
4 5	.220833
1	.221875
2	.222916
3	.223958
4 6	.225
1	.226041
2	.227083
3	.228125
4 7	.229166
1	.230208
2	.23125
3	.232291
4 8	.233333
1	.23435
2	.235416
3	.236408
4 9	.2375
1	.238541
2	.239583
3	.240625
4 10	.241666
1	.242708
2	.24325
3	.24479
4 11	.245833
1	.246875
2	.247908
3	.248958
5 0	.25
1	.251041
2	.252083
3	.253125
5 1	.254166
1	.255208
2	.25625
3	.257291
5 2	.258333
1	.259291
2	.260416
3	.261145

Val.	Decimals	Val.	Decimals	Val.	Decimals
5 3	.2625	5 11	.295833	6 7	.329163
1	.263541	1	.296875	1	.330208
2	.264583	2	.297916	2	.33125
3	.265625	3	.298958	3	.332291
5 4	.266666	6 0	3	6 8	.333333
1	.267708	1	.301041	1	.334291
2	.26875	2	.302083	2	.335416
3	.269791	3	.303125	3	.336145
5 5	.270833	6 1	.304166	6 9	.3375
1	.271875	1	.305208	1	.338841
2	.272916	2	.30625	2	.339583
3	.273958	3	.307291	3	.340625
5 6	.275	6 2	.308333	6 10	.341666
1	.276041	1	.309291	1	.342708
2	.277083	2	.310416	2	.34375
3	.278125	3	.311458	3	.344791
5 7	.279163	6 3	.3125	6 11	.345833
1	.280208	1	.313541	1	.346875
2	.28125	2	.314583	2	.347916
3	.282291	3	.315625	3	.348958
5 8	.283333	6 4	.316666	7 0	.35
1	.284291	1	.317708	1	.351041
2	.285416	2	.31875	2	.352083
3	.286145	3	.319791	3	.353125
5 9	.2875	6 5	.320833	7 1	.354166
1	.288541	1	.321875	1	.355208
2	.289583	2	.322916	2	.35625
3	.290625	3	.323958	3	.357291
5 10	.291666	6 6	.325	7 2	.358333
1	.292708	1	.326041	1	.359291
2	.29375	2	.327083	2	360416
3	.294791	3	.328125	3	.361458

Val	*Decimals*
7 3	.3625
1	.363541
2	.364583
3	.365625
7 4	.366666
1	.367708
2	.36875
3	.369791
7 5	.370833
1	.371875
2	.372916
3	.373958
7 6	.375
1	.376041
2	.377083
3	.378125
7 7	.379163
1	.380208
2	.38125
3	.382291
7 8	.383333
1	.384291
2	.385416
3	.386145
7 9	.3875
1	.388841
2	.389583
3	.390625
7 10	.391666
1	.392708
2	.39375
3	.394791

Val.	*Decimals*
7 11	.395833
1	.396875
2	.397916
3	.398958
8 0	.4
1	.401041
2	.402083
3	.403125
8 1	.404166
1	.405208
2	.40625
3	.407291
8 2	.408333
1	.409291
2	.410416
3	.411458
8 3	.4125
1	.413541
2	.414583
3	.415625
8 4	.416666
1	.417708
2	.41875
3	.419791
8 5	.420833
1	.421875
2	.422916
3	.423958
8 6	.426
1	.426041
2	.427083
3	.428125

Val.	*Decimals*
8 7	.429163
1	.430208
2	.43125
3	.432291
8 8	.433333
1	.434291
2	.435416
3	.436145
8 9	.4375
1	.438841
2	.439583
3	.440625
8 10	.441666
1	.442708
2	.44375
3	.444791
8 11	.445833
1	.446875
2	.447916
3	.448958
9 0	.45
1	.451041
2	.452083
3	.453125
9 1	.454166
1	.455208
2	.45625
3	.457291
9 2	.458333
1	.459291
2	.460416
3	.461458

Value	*Decimals*	*Val.*	*Decimals*	*Value*	*Decimals*
9 3	.4625	9 11	.495833	10 7	.529163
1	.463541	1	.496875	1	.530208
2	.464583	2	.497916	2	.53125
3	.465625	3	.498958	3	.532291
9 4	.466666	10 0	.5	10 8	.533333
1	.467708	1	.501041	1	.534291
2	.46875	2	.502083	2	.535416
3	.469791	3	.503125	3	.536145
9 5	.470833	10 1	.504166	10 9	.5375
1	.471875	1	.505208	1	.538841
2	.472916	2	.50625	2	.539583
3	.473958	3	.507291	3	.540625
9 6	.475	10 2	.508333	10 10	.541666
1	.476041	1	.509291	1	.542708
2	.477083	2	.510416	2	.54375
3	.478125	3	.511458	3	.544791
9 7	.479163	10 3	.5125	10 11	.545833
1	.480208	1	.513541	1	.546875
2	.48125	2	.514583	2	.547916
3	.482291	3	.515625	3	.548958
9 8	.483333	10 4	.516666	11 0	.55
1	.484291	1	.517708	1	.551041
2	.485416	2	.51875	2	.552083
3	.486145	3	.519791	3	.553125
9 9	.4875	10 5	.520833	11 1	.554166
1	.488841	1	.521875	1	.555208
2	.489583	2	.522916	2	.55625
3	.490625	3	.523958	3	.557291
9 10	.491666	10 6	.525	11 2	.558333
1	.492708	1	.526041	1	.559291
2	.49375	2	.527083	2	.560416
3	.494791	3	.528125	3	.561458

Val.	*Decimals*	*Val.*	*Decimals*	*Val.*	*Decimals*
11 3	.5625	11 11	.595833	12 7	.629163
1	.563541	1	.596875	1	.630208
2	.564583	2	.597916	2	.63125
3	.565625	3	.598958	3	.632291
11 4	.566666	12 0	.6	12 8	.633333
1	.567708	1	.601041	1	.634291
2	.56875	2	.602083	2	.635416
3	.569791	3	.603125	3	.636145
11 5	.570833	12 1	.604166	12 9	.6375
1	.571875	1	.605208	1	.638841
2	.572916	2	.60625	2	.639583
3	.573958	3	.607291	3	.640625
11 6	.575	12 2	.608333	12 10	.641666
1	.576041	1	.609291	1	.642708
2	.577083	2	.610416	2	.64375
3	.578125	3	.611458	3	.644791
11 7	.579163	12 3	.6125	12 11	.645833
1	.580208	1	.613541	1	.646875
2	.58125	2	.614583	2	.647916
3	.582291	3	.615625	3	.648958
11 8	.583333	12 4	.616666	13 0	.65
1	.584291	1	.617708	1	.651041
2	.585416	2	.61875	2	.652083
3	.586145	3	.619791	3	.653125
11 9	5875	12 5	.620833	13 1	.654166
1	.588841	1	.621875	1	.655208
2	.589583	2	.622916	2	.65625
3	.590625	3	.623958	3	.657291
11 10	.591666	12 6	.625	13 2	.658333
1	.592708	1	.626041	1	.659291
2	.59375	2	.627083	2	.660416
3	.594791	3	.628125	3	.661458

Value.	Decimals	Value.	Decimals	Value.	Decimals
13 3	.6625	14 0	.7	14 9	.7375
1	.663541	1	.701041	1	.738841
2	.664583	2	.702083	2	.739583
3	.665625	3	.703125	3	.740625
13 4	.666666	14 1	.704166	14 10	.741666
1	.667708	1	.705208	1	.742708
2	.66875	2	.70625	2	.74375
3	.669791	3	.707291	3	.744791
13 5	.670833	14 2	.708333	14 11	.745833
1	.671875	1	.709291	1	.746875
2	.672916	2	.710416	2	.747916
3	.673958	3	.711458	3	.748958
13 6	.675	14 3	.7125	15 0	.75
1	.676041	1	.713541	1	.751041
2	.677083	2	.714583	2	.752083
3	.678125	3	.715625	3	.753125
13 7	.679163	14 4	.716666	15 1	.754166
1	.680208	1	.717708	1	.755208
2	.68125	2	.71875	2	.75625
3	.682291	3	.719791	3	.757291
13 8	.683333	14 5	.720833	15 2	.758333
1	.684291	1	.721875	1	.759291
2	.685416	2	.722916	2	.760416
3	.686145	3	.723958	3	.761458
13 9	.6875	14 6	.725	15 3	.7625
1	.688841	1	.726041	1	.763541
2	.689583	2	.727083	2	.764583
3	.690625	3	.728125	3	.765625
13 10	.691666	14 7	.729163	15 4	.766666
1	.692708	1	.730208	1	.767708
2	.69375	2	.73125	2	.76875
3	.694791	3	.732291	3	.769791
13 11	.695833	14 8	.733333	15 5	.770833
1	.696875	1	.734291	1	.771875
2	.697916	2	.735416	2	.772916
3	.698958	3	.736145	3	.773958

Value.	*Decimals*	*Value.*	*Decimals*	*Value.*	*Decimals*
15 6	.775	16 3	.8125	17 0	.85
1	.776041	1	.813541	1	.851041
2	.777083	2	.814583	2	.852083
3	.778125	3	.815625	3	.853125
15 7	.779163	16 4	.816666	17 1	.854166
1	.780208	1	.817708	1	.855208
2	.78125	2	.81875	2	.85625
3	.782291	3	.819791	3	.857291
15 8	.783333	16 5	.820833	17 2	.858333
1	.784291	1	.821875	1	.859291
2	.785416	2	.822916	2	.860416
3	.786145	3	.823958	3	.861458
15 9	.7875	16 6	.827	17 3	.8625
1	.788841	1	.826041	1	.863541
2	.789583	2	.827083	2	.864583
3	.790625	3	.828125	3	.865625
15 10	.791666	16 7	.829163	17 4	.866666
1	.792708	1	.830208	1	.867708
2	.79375	2	.83125	2	.86875
3	.794791	3	.832291	3	.869791
15 11	.795833	16 8	.833333	17 5	.870833
1	.796875	1	.834291	1	.871875
2	.797916	2	.835416	2	.872916
3	.798958	3	.836145	3	.873958
16 0	.8	16 9	.8375	17 6	.875
1	.801041	1	.838841	1	.876041
2	.802083	2	.839583	2	.877083
3	.803125	3	.840625	3	.878125
16 1	.804166	16 10	.841666	17 7	.879163
1	.805208	1	.842708	1	.880208
2	.80625	2	.84375	2	.88125
3	.807291	3	.844791	3	.882291
16 2	.808333	16 11	.845833	17 8	.883333
1	.809291	1	.846875	1	.884291
2	.810416	2	.847916	2	.885416
3	.811458	3	.848958	3	.886145

Value.	*Decimals*	*Value.*	*Decimals*	*Value.*	*Decimals*
17 9	.8875	18 6	.925	19 3	.9625
1	.888841	1	.926041	1	.963541
2	.889583	2	.927083	2	.964583
3	.890625	3	.928125	3	.965625
17 10	.891666	18 7	.929163	19 4	.966666
1	.892708	1	.930208	1	.967708
2	.89375	2	.93125	2	.96875
3	.894791	3	.932291	3	.969791
17 11	.895833	18 8	.933333	19 5	.970833
1	.896875	1	.934291	1	.971875
2	.897916	2	.935416	2	.972916
3	.898958	3	.936145	3	.973958
18 0	.9	18 9	.9375	19 6	975
1	.901041	1	.938841	1	.976041
2	.902083	2	.939583	2	977083
3	.903125	3	.940625	3	.978125
18 1	.904166	18 10	.941666	19 7	.979163
1	.905208	1	.942708	1	.980208
2	.90625	2	.94375	2	.98125
3	.907291	3	.944791	3	.982291
18 2	.908333	18 11	.945833	19 8	.983333
1	.909291	1	.946875	1	.984291
2	.910416	2	.947916	2	.985416
3	.911458	3	.948958	3	.986145
18 3	.9125	19 0	.95	19 9	.9875
1	.913541	1	.951041	1	.988841
2	.914583	2	.952083	2	.989583
3	.915625	3	.953125	3	.990625
18 4	.916666	19 1	.954166	19 10	.991666
1	.917708	1	.955208	1	.992708
2	.91875	2	.95625	2	.99375
3	.919791	3	.957291	3	.994791
18 5	.920833	19 2	.958333	19 11	.995833
1	.921875	1	.959291	1	.996875
2	.922916	2	.960416	2	.997916
3	.923958	3	.961458	3	.998958

The Uſe of the foregoing Table I ſhall endeavour to make as plain as poſſible, by ſeveral Queſtions following; and the Method of calculating the foregoing Table is very plain to thoſe who underſtand *Reduction of Decimal Fractions.*

The Method I ſhall moſt commonly uſe in finding the Value of any Number of Yards, Ells, and ſuch like, ſhall be this, To multiply the Number of Yards, Ells, and ſuch, by the Tabular Number anſwering the Value of one Yard, Ell, and ſuch like, in Decimal Parts of a Pound, and the Product will be the Anſwer required.

At 3 *d.* the Yard, What will 80 coſt?

For 3 *d.* Tabular Number .025

Anſwer, *L.* 1.0000

I multiplied the lower Line by the Higher, and it is evident that 80 Three-pences is one Pound.

At 6 *d.* the Yard, What will 24 coſt?

			Or thus,
		.025	½ | 24
	s. *d.*		
Anſwer,	12 0	120	Anſ. 12 *s.*
		48	
	Shill.	.600	

At 2 *s.* ℔, What will 244 coſt? Make a Prick for the Decimal Parts, between the laſt Figure and the Next, and you have the Anſwer.

Thus, 24.4 Anſwer, 24 *l.* 8 *s.* 0 *d.*

At 4 *s.* 6 *d.* ℔ Ell, what will 372 coſt?

Or thus, Multiply by the Decimal to a Shilling, and the Number of Shillings.

372
4.5
1860
1488
2|0 | 167|4.0
L. 83 : 14 as before.

.225
1860
744
744
L. 83.700

Or thus,
$\frac{1}{2}$ | 372
$\frac{1}{10}$ 46 10
37 04
L. 83 : 14

By doing thus, I hope I ſhall make Decimals plain to you.

If at any Time your Value be Shillings, Pence, Farthings, and Half Farthings; you may find the firſt in the Table in its Place, and add the Half Farthing Decimal to it, and multiply as before, and you have the Anſwer.

At 2 *d.* $\frac{1}{2}$ $\frac{1}{8}$ ℔ Pound, what will 269 Pound coſt?
Tabular Number for 2*d.* $\frac{1}{2}$ is .010416 } Add.
For Half a Farthing, 0005208 }

.0109368 Sum.
269 Given N°.

This is a Proof to a Queſtion in Practice in Whole Numbers, and I think, as eaſy to work as it is done there.

984312
656208
218736
L. 2.9419992

Anſwer, 2 *l.* 18 *s.* 10 *d.* $\frac{1}{2}$.

At 4*d*. ¼ ℔ what will 244 coſt?
Tabular Number for 4*d*. ¼ .01979

7916
7916
3958

l. 4.82876 Anſwer, 4*l*. 16*s*. 6*d*. ¼

At 1 *s*. 3 *d*. ℔ what will 248 coſt?
Tabular N°. for 1 *s*. 3 *d*. .0625

1240
496
1488

l. 15.5000 Anſwer, 15*l*. 10*s*. 0*d*.

At 3 *s*. the Yard, what will 246.5 or 246 ½?
Tabular Number for 3 *s*. is .15

I hope I need not tell you that .5 is equal to ½.

12325
2465

l. 36.975 Anſwer, 36*l*. 19*s*. 6*d*.

At 5 *s*. the Yard, what will 72 coſt?
Tabular Number for .5 *s*. is .25

Or thus,
¼ | 72
l. 18 Anſ.

360
144

l. 18.00 Anſwer, 18*l*.

At 7 *s*. the Yard, what will 96 coſt?
Tabular Number for 7 *s*. is .35

480
288

l. 23.60 Anſ. 23*l*. 12*s*.

At

At 8 *s.* the Pound, what will 112 coſt?

·4

l. 44.8 Anſwer, 44 *l.* 16 *s.*

At 10 *s.* the Yard, what will 24.25 or 24 $\frac{1}{4}$ coſt?

·5

l. 12.125 Anſwer. 12 *l.* 2 *s.* 6 *d.*

At 11 *s.* 11 *d.* $\frac{3}{4}$ the Groſs, what will 254 coſt?

Tabular Number for 11 *s.* 11 *d.* $\frac{3}{4}$ is ·5989

2286
2032
2286
1270

Anſwer, 152 *l.* 2 *s.* 4 *d.* $\frac{3}{4}$ *l.* 152.1206

My Factor was Debtor to me in the Sum of 330 *l.* and ſent me a Bill of 320 Piſtoles, at 16 *s.* 6 *d.* ℔, what was he ſtill in my Debt?

320 Piſtoles.

Tab. N°. for 16 *s.* 6 *d.* .825

1600
640
2560

l. 264.000

	l.
Debt was	330
Received	264
Remains	66 due.

Received 264 *l.* 0 *s.* 0 *d.*

Anſwer, The Factor is indebted in 66 *l.*

I lent my Neighbour 240 Pounds, and when I had Occaſion for my Money he ſent me a Bill in Hand of 355 Marks Value, at 13 *s.* 4 *d.* ℔; Whether did he remain in my Debt or no, and what?

355 Marks.

Tab. N°. for 13 *s.* 4 *d.* is 66666

Debt 240 *l.*			2130	This in Reality ought to be 13 *s.* 4 *d.* tho' the Decimal does not amount to ſo much.
Paid 236 *l.* 13 *s.* 4 *d.*			2130	
Bill Dr.	3	6	8 2130	
			2130	
			2130	

Anſwer,

l. 236.66430 — 236 *l.* 13 *s.* 4 *d.*

A Merchant received a Bill of Exchange of 2364 Piaſtres, at 4 *s.* 6 *d.* ℔; I demand how many Pounds Sterling he muſt receive for this Bill?

2364 Piaſtres.

Tabular Numb. for 4 *s.* 6 *d.* is .225

11820
4728
4728

Anſwer, 531.900=531 *l.* 18 *s.*

At 15 *s.* the Ell, what will 265.75, or 265 ¾ coſt?

Tabular Number for 15 *s.* is .75

132875
186025

Anſwer, *l.* 199.3125=199 *l.* 6 *s.* 3 *d.*

At 15 *s.* 6 *d.* the Jean End, what will 40 coſt?

Tabular Number for 15 *s.* 6 *d.* is .775

Anſwer, *l.* 31.000=31 *l.* 0 *s.*

At

At 16 *s.* 9 *d.* the Pillow End, what will 54 coſt?
Tabular Numb. for 16 *s.* 9 *d.* is .8375

33500
41875

Anſwer, 45 *l.* 4 *s.* 6 *d.* *l.* 45.2250

At 18 *s.* 4 *d.* ½ the Cheque Piece, What will 64 coſt?
Tabular Number for 18 *s.* 4 *d.* ½ is .91875

367500
551250

Anſwer, 58 *l.* 16 *s.* 0 *d.* *L.* 58.80000

s. d. *C. qrs. lb.*
At 18 9 the Hundred, What will 12 3 14 coſt?

By the Table for *qrs.* and *lb.* and Tare and Tret, you will find the Decimal Parts for 3 Quarters, 14 Pounds, is .875 and then it will ſtand thus, - - - - - - - 12.875 }
Tabular N°. for 18 *s.* 9 *d.* is .9375 } multiply

64375
88025
38625
115875

l. s. d.
L. 12.0682125 An. 12 1 4 ½

C. qr. lb.
At 18 *s.* the Hundred, What will 40. ½ 14 coſt?
40.125
Tabular N°. for 18 *s.* is .9

L. 36.1125 Anſ. 36 *l.* 2 *s.* 3 *d.*

At

At 12 *s.* 4 *d.* ¼ ℔ Hundred, What will 324.5 coſt?
Tabular Number for 12 *s.* 4 *d.* ¼ is .61979

29205
22715
29205
3245
19470

Anſwer 201 *l.* 2 *s.* 5 *d.* ¼ *fere.*
See by the Table, *L.* 201,121855 Anſ.

At 17 *s.* 6 *d.* ℔ Load, What will 36 coſt?
Tabular Number for 17 *s.* 6 *d.* ℔, .875

5250
2625

Anſwer, 31 *l.* 10 *s.* 0 *d.* *L.* 31.500 Anſwer.

At 19 *s.* 9 *d.* ℔ Cheque Piece, What will 3 Packs coſt, each Pack 34 Pieces.

34 Pieces.
3 Packs.
102 Pieces.

Tabular Number for 19 *s.* 6 *d.* .975

1950
9750

Anſwer 99 *l.* 9 *s.* 0 *d.* *L.* 99.450 Anſwer.

Thus, by the Help of the Tables you may work Quarters, Pounds and Shillings, Pence and Farthings, the ſame as Multiplication of Whole Numbers.

At

l. s. d. *C. qr. lb.*
At 1 3 6 the Hundred, what will 35 3 14 coſt?

Tabular Number for 3 *qrs.* 14 *lb.* is by the Table in *Tare and Tret* .875:

Then it will ſtand thus, 35.875
For 3 *s.* 6 *d.* is by Table .175 } 1.175 } Mult.
and will ſtand thus, - - }

179375
251125
35875
35875

l. 42.153125 Anſwer.

l. s. d.
Anſwer, 42 3 0 $\frac{3}{4}$

If you do not underſtand the Value of your Decimal Parts, look in the Table, and you may either find the ſame, or near to it, ſo near as can make no great Miſtake; for you may be within the Million Part of a Farthing.

As for Inſtance, Seek the laſt Decimal Parts in the Table, *viz.* .153125, and over againſt 3 *s.* 0 *d.* $\frac{3}{4}$ you may find the ſame Number.

s. d.
At 19 11 $\frac{3}{4}$ the Yard, what will 744 coſt?
Tabular Numb. for 19 *s.* 11 *d.* $\frac{3}{4}$ is .998958

3995832
3995832
6992706

l. 743.224752 Anſw.

l. s. d.
Anſwer, 743 4 6 *fere*, and is a Proof to One in Whole Numbers.

At

l. s. d. *C.*

At 2 10 6 the Hundred, what will 24.75, or 24 *C.* 3 *qrs.* coſt?

Tab. N°. for 10*s.* 6*d.* is .525 then thus 2.525

12375
4950
12375
4950

Anſwer, 62 9 10½

Anſwer, *l.* 62.49375

At 3*l.* 17*s.* 6*d.* the Year's Rent, what will 35 Years come to, at the ſame Rent? 3.875

19375
11625

Anſ. 135*l.* 12*s.* 6*d.* *L.* 135.625 Anſ.

At 2 *l.* 2 *s.* 6 *d.* the Quarterly Payment, what will the Rent or Annuity for 24 Years come to after the ſame? *l.*

Yearly Payment is 8*l.* 10*s.* 0*d.* thus, 8.5

Years, 24

l.

Anſwer, 204 340
170

Or thus,

For 10*s.* take ½ 24 Years. *L.* 204.0 An.

8

192
12

L. 204 Anſwer as before.

A Mer-

A Merchant at *Madrid* being indebted to a Tradeſman at *Mancheſter* in the Sum of 450 *l.* Sterling, for which the *Spaniſh* Merchant ſent the *Engliſh* Tradeſman a Bill for the Value of 1740 Piaſtres, to be drawn at *London*, each Piaſtre at 4 *s.* 6 *d.* Sterling. The Queſtion is, Whether the *Spaniſh* Merchant's Bill paid the whole Debt or no? and if not, what was the Difference betwixt them?

	1740 Piaſtres.
Tabular Number for 4 *s.* 6 *d.* is	225
	8700
Anſwer, The *Spaniſh* Merchant's Bill was worth 392 *l.* 10 *s.* 0 *d.*	3480
	3480
	l. 392,500 Anſw.

	l.	*s.*	
Due to the *Engliſh* Tradeſman,	450	0	
Paid by the *Spaniſh* Merchant,	392	10	
The *Spaniſh* Merchant remain'd Debtor to the *Engliſh* Tradeſman -	*l.* 57	10	Difference

I hope by this Time the Learner will be made to underſtand *Decimals* well; if not, he never will do, for I have work'd them with all the Plainneſs I could invent.

A TABLE for buying and selling of any Commodity by the great Hundred, which is 112 Pounds, commonly called the Merchant's Hundred.

Val.	Amount	Val.	Amount	Val.	Amount	Val.	Amount	Val.	Amount
d. f.	l. s. d.	d. f.	l. s. d.	d. f.	l. s. d.	d. f.	l. s. d.	d. f.	l. s. d.
1	2 4	6 —	2 16 0	12 —	5 12 0	18 —	8 8 0		
2	4 8	1	2 18 4	1	5 14 4	1	8 10 4		
3	7 0	2	3 0 8	2	5 16 8	2	8 12 8		
1 —	9 4	3	3 3 0	3	5 19 0	3	8 15 0		
1	11 8	7 —	3 5 4	13 —	6 1 4	19 —	8 17 4		
2	14 0	1	3 7 8	1	6 3 8	1	8 19 8		
3	16 4	2	3 10 0	2	6 6 0	2	9 2 0		
2 —	18 8	3	3 12 4	3	6 8 4	3	9 4 4		
1	1 1 0	8 —	3 14 8	14 —	6 10 8	20 —	9 6 8		
2	1 3 4	1	3 17 0	1	6 13 0	1	9 9 0		
3	1 5 8	2	3 19 4	2	6 15 4	2	9 11 4		
3 —	1 8 0	3	4 1 8	3	6 17 8	3	9 13 8		
1	1 10 4	9 —	4 4 0	15 —	7 0 0	21 —	9 16 0		
2	1 12 8	1	4 6 4	1	7 2 4	1	9 18 4		
3	1 15 0	2	4 8 8	2	7 4 8	2	10 0 8		
4 —	1 17 4	3	4 11 0	3	7 7 0	3	10 3 0		
1	1 19 8	10 —	4 13 4	16 —	7 9 4	22 —	10 5 4		
2	2 2 0	1	4 15 8	1	7 11 8	1	10 7 8		
3	2 4 4	2	4 18 0	2	7 14 0	2	10 10 0		
5 —	2 6 8	3	5 0 4	3	7 16 4	3	10 12 4		
1	2 9 0	11 —	5 2 8	17 —	7 18 8	23 —	10 14 8		
2	2 11 4	1	5 5 0	1	8 1 0	1	10 17 0		
3	2 13 8	2	5 7 4	2	8 3 4	2	10 19 4		
		3	5 9 8	3	8 5 8	3	11 1 8		
						24 —	11 4 0		

The

The EXPLANATION *of the foregoing Old* TABLE, *I here inſerted for thoſe who does not underſtand* Arithmetick.

At 2 *d.* ½ the Pound, Yard, Ell, or any other Thing at that Price, What will 112 of the ſame Commodity coſt?

Look for 2 *d.* ½ in the firſt Column, and juſt againſt it in the ſecond Column you will find 1 *l.* 3 *s.* 4 *d.* which is the *Amount*.

At 9 *d.* ℔, What will 112 coſt?

Look in the third Column, and under *Value* you will find 9 Pence, and over againſt it you will find 4 *l.* 4 *s.* 0 *d.* the Anſwer required.

At 23 *d.* ¼ ℔, what will 112 coſt?

Look for 23 ¼ in the ſeventh Column, and over againſt it towards the Right Hand you will find 11 *l.* 1 *s.* 8 *d.* the Anſwer.

Or thus you may do without the Table by this

RULE.

For every Farthing that one Pound doth coſt, reckon two Shillings and four Pence, and that's the Price of the Great Hundred Weight.

At 4 *d.* ½ the Pound, what will 112 Pound coſt?

	l.	*s.*	*d.*
In 4 *d.* ½ are 18 Farthings: Now 18 Times 2 Shillings is - - - -	1	16	0
And 18 Groats is equal to - - -		6	0
The ſame as the Table gives it	*L.* 2	2	0

And ſo of any other.

In

In the Uſe of the foregoing TABLE.

At 14 *d.* ½ the Yard, what will 112 coſt?

Look for 14 *d.* ½ in the fifth Column, and againſt it you'll find towards the Right Hand in the next Column 6 *l.* 15 *s.* 4 *d.* the Anſwer required.

Or without the TABLE.

In 14 *d.* ½ are 58 Farthings: Now twice 58 is 116.

And 116 Shillings are equal to	*l.*	5	16	0 } Add.
And 58 Groats are equal to		0	19	4 }
The Anſwer as before,	*l.*	6	15	4

At 18 *d.* the Pound, what will 112 coſt?

4

72

Twice 72 is 144, equal to -	*l.*	7	4	0 } Add.
And 72 Groats is equal to -		1	4	0 }
The Anſwer required,	*l.*	8	8	0

Menſuration of Superficies.

A SUPERFICIES is a Quantity to which is given Length and Breadth, without conſidering the Thickneſs.

But before I ſhall ſet any Queries I will calculate two Tables which will be of great Uſe.

A TABLE *of* DECIMALS *anſwering to all the Inches, and Quarters of an Inch, in one Yard, making one Yard the Integer.*

Inches.	*Decimals.*	*Inc.*	*Deci.*	*Inc.*	*Deci.*	*Inc.*	*Deci.*
¼	.0069	8	.2222	18	.5	28	.7777
½	.0138	9	.25	19	.5277	29	.8055
¾	.0208	10	.2777	20	.5555	30	.8333
1	.0277	11	.3055	21	.5833	31	.8611
2	.0555	12	.3333	22	.6111	32	.8888
3	.0833	13	.3611	23	.6388	33	.9166
4	.1111	14	.3888	24	.6666	34	.9444
5	.1388	15	.4166	25	.6944	35	.9722
6	.1666	16	.4444	26	.7222		
7	.1944	17	.4722	27	.75		

A TABLE *of* DECIMALS *anſwering to all the Inches and Quarters of an Inch in one Foot, making one Foot the Integer.*

Inches.	*Decimals.*	*Inc.*	*Deci.*	*Inc.*	*Deci.*	*Inc.*	*Deci.*
¼	.0208	2	.1666	6	.5	10	.8333
½	.0416	3	.25	7	.5833	11	.9166
¾	.0624	4	.3333	8	.6666		
1	.0833	5	.4166	9	.75		

Of

Of Four Sided Figures.

A SQUARE.

A Square is a Geometrical Figure, whose Area is limitted by four equal plain regular Sides, and as many Right Angles, all parallel and perpendicular to one another.

The Area of Squares, and all other Parallelograms, are compoſed or filled up with an infinite Series of equal Right Lines. To find the Area, obſerve this one GENERAL RULE.

Multiply one of the Sides into it ſelf, the Product is the Area.

Admit a Pane of Glaſs (or a Board) in the Form of a Square, each Side being 2 Foot 9 Inches; What's the Area?

	Feet
Demenſions are taken in Feet and Decimal Parts.	2.75
	2.75
	1375
	1925,
	550
	7.5625 Area *Feet.* 7.5625

Admit a Square Piece of each Side, being 25.5 Poles; What's the Area in Acres?

	25.5
	25.5
N. B. There are 160 Poles in an Acre.	1275
	1275
	510
160 | 650.25	4.064 Area in Acres.
	640
	1025
	960
	650
	640
	10

A PARALLELOGRAM.

A *Parallelogram* is also called an Oblong, or a Long Square, and is a Figure having four Sides; and as many Right Angles, the opposite Sides thereof being equal and Parallel. To find the Area, observe this one

GENERAL RULE.

Multiply the Length by the Breadth, the Product is the Area.

Admit a Pane of Glass (or a Board) in the Form of a Long Square, whose Length was 4 Foot 6 Inches, and the Breadth 2 Foot 3 Inches, What's the Area in Feet?

Feet.

4.5 Length.
2.25

1125
900

10.125 Area

Foot. Inch.
10 1 ½

N. B. Demensions for Glass I take in Inches, and the Tenths of an Inch; tho' this is not.

Admit a Wall was built 22 Foot 6 Inches long, and 14 Foot 9 Inches high, What's the Area in Yards?

22.5 Long.
14.75 High.

7375
2950
2950
---
9 | 331.875

36.875 Area in Yards.

N. B. 9 Superficial Square Feet are one Yard of Walling.

Admit

Admit a Houſe was Slated, whoſe Length was 35 Foot 7 Inches, and the Girt over the ſaid Houſe was 25 Foot 4 Inches; What's the Area in Roods?

Feet.

35.5833 Long.
25.333

N. B. 400 Superficial Square Foot is 1 Statute Rood of Slate; but there are cuſtomary Roods of other Meaſure.

1067499
1067499
1067499
1779165
711666

4|00 | 901.4317389

2.253329 Area in Roods.

Admit a Pane of Glaſs was 48.3 Inches long, and the Breadth was 14.5 Inches, What's the Area in Feet?

Inches.

48.3 Long.
14.5 Breadth.

N. B. 144 Superficial Square Inches, *viz.* 12 Inches long and 12 Inches broad, is one Foot of Glaſs (or Board.)

2415
1932
483

Area.

144 | 700.35 | 4.8635
576
1243
1152
915
864
510
432
780
720
60

To

To meaſure a Long Square, which is broader at one End than the other, (as Kible-Boards are generally.) To find the Area, obſerve this one

GENERAL RULE.

Add both Ends together, Half the Sum multiplied by the Length, gives the Content.

Admit a Board was 14.5 Inches broad at one End, and 16 Inches at the other End, and the Length was 15 Foot; What's the Area in Feet?

14.5 One End.
16. the other End.

30.5 Sum of both.

Mean 15.25 Half Sum.
15 Foot long.

N. B. I multiplied the Mean Breadth by the Length in Feet, and Divided by 12, and the Area is the Anſwer in Feet.

7625
1525

12 | 228.75 |

19.0625 Area in Feet.

A TRIANGLE.

The Area of every plain *Triangle* is compoſed of an infinite Series of right Lines, parallel to its Baſe, and equally decreaſing until they terminate in a Point, at the Vertical Angle.

N. B. A *Triangle* is one Half of it's Circumſcribing Parallelogram. To find the Area, obſerve this one

GENERAL RULE.

Multiply the Baſe by Half the Perpendicular, and the Product is the Area.

Admit the Gable-end of a Houſe, in the Form of a Triangle, whoſe Baſe was 5.25 Yards, or 5 Yards and 9 Inches; and the Perpendicular was 2.75 Yards, or 2 Yards 2 Foot and 3 Inches, What's the Area?

Yards.

5.25 Baſe.
1.375 Half Perpendicular.

2625
3675
1575
525

7.21875 Area in Yards.

½ | 2.75 Perpen'r.
1.375

Take your Demenſions in Yards and Decimal Parts for Walling, Flaging, Plaiſtering, &c. and it will ſave a deal of Trouble and Figures: But when I meaſure Glaſs I take my Demenſions in Inches, and the Decimal Parts of an Inch.

A RHOMBUS.

A *Rhombus* is a Figure repreſenting a Quarry of Glaſs (and is only a Square put out of it's right Poſition,) having four Sides, the Oppoſites thereof being equal, and four Angles; two being Obtuſe, and two Acute Angles. To find the Area, obſerve this

GENERAL RULE.

Multiply one of the Sides by a Perpendicular let fall from one of the Obtuſe Angles, and the Product is the Area.

Admit

Admit a Board in the Form of a *Rhombus*, whoſe Side was 18 Inches, and the Perpendicular let fall was 16.5 Inches, What's the Area in Feet?

18
165
1320
12 | 297.0 |
12 | 24.75
2.0625 Area in Feet.

The like may be done for any *Rhomboides*, whoſe Length and Perpendicular Breadth are given. For a *Rhomboides* is only a *Parallelogram* put out of it's right Poſition. To find the Area, obſerve this

GENERAL RULE.

Multiply one of the longeſt Sides by a Perpendicular let fall, from one of the obtuſe Angles, and the Product is the Area.

Admit a Piece of Land in the Form of a *Rhomboides*, whoſe longeſt Sides are 80 Poles, and the Perpendicular was 60 Poles, What's the Area in Acres?

80
160 | 4800 | 30 Area in Acres.
480
0

A TRAPEZIUM.

A *Trapezium* is a Figure having four Sides, and as many Angles, two being Acute, and two

being Obtuſe Angles. To find the Superficial Area, draw a Diagonal Line between the Acute Angles, and let two Perpendicular fall from the obtuſe Angles, and then work by this

GENERAL RULE.

Multiply the Diagonal by Half the Sum of the Perpendiculars, and the Product is the Area.

Admit a Field in the Form of a *Trapezium*; The Length of the Diagonal was 80 Poles, the One Perpendicular was 36 Poles, the other Perpendicular was 24 Poles, What's the Area in Acres?

The One Perpendicular,	36	Poles.
The other Perpendicular,	24	
The Sum of both,	60	
The mean Perpendicular,	30	
The Diagonal,	80	

160 | 2400 | 15 Area in Acres.
160
800
800
0

N. B. As I have ſet no Examples but one a piece to ſeveral of the laſt mentioned Figures, you may turn them to any Superficial Meaſure, obſerving the ſaid reſpective Rules laid down.

Obſerve that all *Trapezias* or *Figures*, with four unequal Sides; alſo *Multangular*, or many *ſided Irregular Figures* muſt be divided into *Triangles*, and thoſe *Triangles* meaſured, as before is taught,

taught, and their Sums added together, will be the Area of ſuch irregular Figures. And, *Note*, That the leaſt Number of *Triangles* into which any Plot or irregular Figure may be reduced, will be leſs by two than the Number of Sides of ſuch irregular Figures.

A CIRCLE.

The Area of a *Circle* may be compoſed either of an infinite Series of Concentrick, or Parallel Circles; or of an infinite Series of Chord Lines parallel to it's Diameter; or of an innumerable Multitude of Sectors.

The Area or Superficial Content of a *Circle* is found by the Diameter or Circumference, or by both; for the Area of every Circle is equal to Half the Rectangle of the Radius into it's Periphery. To find the Area, obſerve this

GENERAL RULE.

Multiply Half the Diameter by Half the Circumference, the Product is the Area.

Admit the Diameter was 21 Inches, and the Circumference was 66 Inches, What's the Area?

Half the Diameter, 10.5 Inches.
Half the Circumference, 33

315
315

346.5 Inches Area.

The

The Circumference of *Circles* are in Proportion one to another as their Diameters.

Having the Diameter, to find the Circumference.

The Proportions following are commonly made uſe of.

As { 7 / 113 / 1 } is to { 22 / 355 / 3.14159 } So is the Diameter to the Circumference.

Having the Periphery or Circumference, to find the Diameter.

The Proportions following are commonly made uſe of.

As { 22 / 355 / 3.14159 } is to { 7 / 113 / 1 } So is the Circumference to the Diameter.

Theſe are only the Reverſe of the former.

An ELLIPSIS.

The Area of an *Ellipſis* (or *Oval*,) may be compoſed either of an infinite Series of Ordinates rightly apply'd, or of an infinite Series of Right Lines parallel to its Tranſverſe Diameter. To find the Area, obſerve this

GENERAL RULE.

Multiply the Rectangle of the Diameters by .7854, the Product is the Area.

Admit

Admit a Table in the Form of an *Ellipſis* (or *Oval*) whoſe Tranſverſe Diameter was 40 Inches, and the Conjugate Diameter was 30 Inches, What's the Area?

40
30

1200 Rectangle.
.7854 The Area of a Circle when the Diameter is One.

942.4800 Area in Inches.

Menſuration of Solids.

A PRISM.

A PRISM is a Solid Body, contained or included within ſeveral equal Parallelograms, having it's Baſes or Ends equal and alike; and it's generally named according to the Figures of it's Baſe, That is,

A *Cube* (or *Solid* like a Dye) is a *Priſm*, bounded or included within Six equal Square Plains. To find the Area, obſerve this

GENERAL RULE.

Multiply the Side into itſelf, and that Product by the ſame, and the latter Product is the Area.

Admit

Admit a Veſſel was made in the Form of a *Cube* (or *Dye*) each Side being 36 Inches, and the Depth the ſame; What's the Area in Ale Gallons, and what will the Ale come to at 16 *d.* ℔ Gallon?

36
36

216
108

1296
36

7776
3888
---
282 | 46656 | 165.446 Area in Gallons.
282

1845
1692

1536
1410

1260
1128

1320
1128

1920
1692

228

Gallons.
4 *d.*—⅓ | 165.446 at 16 *d.* *per.*
55.148

2|0 | 220.594

L. 11.0297
Anſwer, 11 *l.* 0 *s.* 7 *d.*

N. B. There are 282 Solid Inches in one Gallon of Ale.

This Quere is the ſame, as if it was required to know, what one Solid Yard of Ale wou'd coſt? which Anſwer is 11 *l.* 0 *s.* 7 *d.* And two Solid Yards of Ale, at the ſame Price, wou'd coſt eight Times as much, or 88 *l.* 4 *s.* 8 *d.* but try at Leaſure.

N. B. That Timber, Hay in Mows, or Ricks, *&c.* may be meaſured by theſe Rules, according to the Form that they are in.

A PARALLELOPIPEDON.

A *Parallelopipedon* is a Priſm that hath it's Sides bounded or included within four equal Parallelograms, and two Square Baſes or Ends.

The

The Solidity of every Prism is compoſed of an infinite Series of equal Plains, parallel and alike to that of it's Baſe.

A Tree, or the Part of a Tree, hewn or ſawn to the Square, (as Deal Banks and ſuch like) are in the Form of a *Parallelopipedon*. To find the Area, obſerve this

GENERAL RULE.

Multiply one of the Sides into it ſelf, and that Product by the Length, and the Product is the Area.

Admit a Piece of Timber in the Form of a *Parallelopipedon*, each Side being 14 Inches, and the Length 30 Foot, What's the Area in Feet?

When the Side is given in Inches, and the Length in Feet, as here, you muſt multiply the Product of the Sides by the Length in Feet, and divide by 144, and the Quotient is the Area: But if you multiply the Product of Sides by the Length in Inches, you muſt divide by 1728, for there are 1728 ſolid Inches in one ſolid Foot of Timber.

Inches.
14 } Sides.
14 }
56
14
196
Foot 30 Long.
12|5880
12|490
Area 40.8333 *F.*

When the Sides are not exactly Square, take the Breadth and Thickneſs, and multiply the one by the other, and the Product by the Length, and you have the Area. But if your Piece be greater at one End than at the other, find the Area at either End, and find a Geometrical Mean between the two Areas; add the two Areas and the

Mean together, and multiply the Sum by one Third of the Length, and you have the Area.

To find a Geometrical Mean; add the two Areas together, and extract the Square-Root out of the Sum, and the Square-Root is the Mean betwixt them; or measure the Tree in the Middle Taper regularly.

A CONE.

A *Cone* is a Figure ſtanding upon a Circular Baſe, broad at the Bottom, and narrower upwards, and pointed at the Top. To find the Area, obſerve this

GENERAL RULE.

Multiply the Superficial Area of the Baſe by one Third Part of the Height and Length, and the Product is the Area.

Admit a Stack of Hay in the Form of a *Cone*, whoſe Baſe Circumference was 44 Foot, and the Length or Height was 14 Foot 9 Inches, What's the Area in Yards?

½ Circumference 22
½ Diameter 7

As 22 : 7 : 44
7
22 | 308 | 14 Diam.
22
88
88
·

154 Area of the Baſe.
4.75 ⅓ of Length.
770
1078
616
9 | 731.50
3 | 81.2777

⅓ | 14.25 Height.
4.75

Area 27.0925 Yards.

N. B.

N. B. One Yard of Hay is 3 Foot long, 3 Foot broad, and 3 Foot thick, which is 27 Foot, for a Diviſor. But you may take your Demenſions in Yards and Decimal Parts for Hay, and then you do not need to Divide at all.

A CYLINDER.

A *Cylinder* (or *Solid*, like the Rolling Stone in a Garden) is only a round Priſm, having its Baſes or Ends a perfect Circle. To find the Area, obſerve this

GENERAL RULE.

Multiply the Area of the Baſe by the Length, and the Product is the Area.

Admit a Piece of Timber was in the Form of a *Cylinder*, whoſe Circumference was 48 Inches, and the Length was 30 Foot, What's the Area?

As 22 : 7 : 48

7

22 | 33.6 | 15.2727 (1/2)

22

116

110

60

44

160

154

60

1/2 Circumf. 24 } Mul.
1/2 Diamet. 7.636 }

30544
15272

Area of the Baſe 183.264

30 Length

12 | 5497.920
12 | 458.160

38.18 Foot.

N. B. If this Piece of Timber was meaſured by the cuſtomary Way of taking the fourth Part of the Girt or Circumference for the Side of a Square

Square equal, it will be found to be exactly 30 Foot, and no more. But between Buyer and Seller, I look upon this Way to be very reaſonable: Still, between the Buyer and the Leader of Wood (who leads for Hire, and by Meaſure,) I think it is very unreaſonable for to lead 38.18 Foot for only 30 Foot Wages; if he is oblig'd ſo to do, he muſt go about every fifth Time with his Carriage, for nothing, if not oftner.

Note, The Fruſtum of a *Cone* is a Figure repreſenting a *Churn*, whoſe Diameter at one End is greater than the Diameter at the other End: And the cuſtomary Way to meaſure the ſame, if Timber is to take the Girt, in the Middle in Inches, and to take the fourth Part of that for the Side of a Square equal thereto; and by that Means it is brought into the Form of a *Cylinder*, and then meaſured as the laſt.

ERRATA.

PAGE 4. Reſt Line, *for* 17916, *read* 16916.—P. 9. l. 1. *for* 4 Gallons, *read* 2 Gallons.—P. 18. l. 9. *for* 6 *d.* *read* 6 $\frac{1}{4}$ *id.* l. 10 *for* 6*d.* *r.* 5*d.* $\frac{3}{4}$. *Id.* l. 21. *for* 19 *dwts. r.* 18 *dwts.*—P. 24. l. 25. *for* 427. *r.* 425.—P. 26. l. 3. *r. on the other Side this Leaf.*—P. 30. laſt Line, *for* 18*s.* *r.* 19*s.*—P. 31. l. 13. *for* 18*s.* *r.* 19*s.*—P. 59. Tare Line, *for* 8*lb.* *r.* 5*lb.* look Page 235.——P. 118. *Anſwer* ſhould be 1408 *Angles*, 6*s.* 8*d.*——P. 132. l. 2. *for* 82. *r.* 84 Yards.—P. 175. l. 5. *for* 12*s.* *r.* 18*s.*—P. 222. l. 17. *for* 23. *r.* 13.—P. 257. l. 5. *for* 10*s.* *r.* 12*s.*

FINIS.